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Improved Lumber Measure.

The process of measuring lumber—or ascertaining the superficial area in any plank—is much facilitated by the use of the very ingenious instrument herewith illustrated. By simply rolling it over the face of the board the number of superficial feet is shown on the dial. Different lengths of timber are gaged by setting the gear, A, in connection with either one of the train of wheels, B, into which the first wheel gears. In Fig. 2 the driving wheel, C, is shown; this is made of thin steel and has teeth which project through the case, D, so that by rolling the instrument over the board the teeth adhere and rotate the mechanism inside. This consists of the gears formerly mentioned, and the worm, E. The worm gears with the wheel, F, upon the shaft on which the index hands are fixed. A small slide or spring, at G, keeps the wheels in gear; by moving it on one side, the shaft, H, may be moved endwise to alter the registration of the hands on the dial. This little instrument is set on the end of an octagonal rule or staff, such as is generally used by lumber inspectors; and there is, in addition, a shoe or guard, I, at one side of the wheel, which prevents the wheel from turning should the instrument be drawn backwards. This is a very neat and useful article and will no doubt be popular. An application for a patent is pending through the Scientific American Patent Agency by A. M. Olds, of Chicago, Ill., of whom further information may be had by addressing him at that place.

Fig. 1.

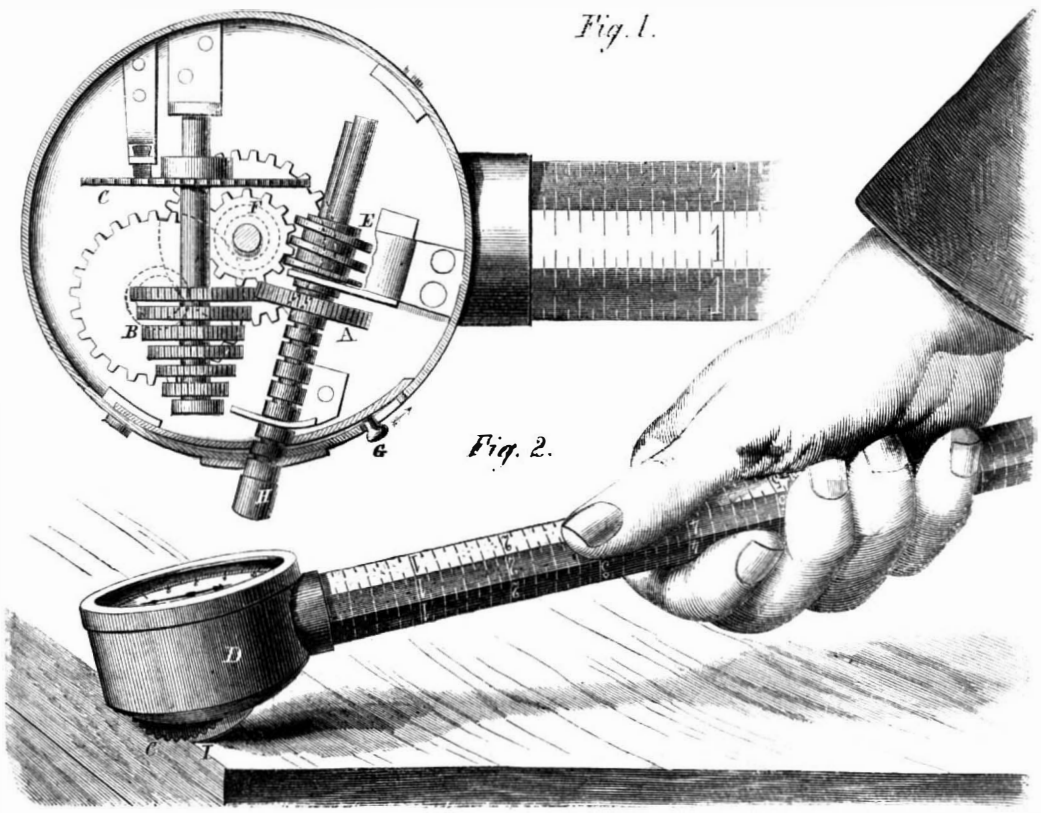

Fig. 2.

OLD'S LUMBER MEASURE.

John Fitch Wanted Four Hundred Dollars.

Westcott, in his "Life of John Fitch," relates the following humorous incident. It occurred during a visit of Fitch to Mr. Brown:—

"He stated that he had built a vessel or vessels to give practical proof to the world of the value of his invention; that the machinery of his boat or boats required some change or amendment to satisfy the world that steamboats could and would navigate our rivers against their currents. This, his discovery, would be of peculiar and immense advantage to Mr. Brown's district, of Kentucky. He (Fitch) was without means or resources, and wanted about four hundred dollars, and had called upon Mr. Brown, as a Member of Congress from Kentucky, to advance him that sum. Mr. Brown replied that it was not convenient—that he had not the money to spare him. Mr. Fitch, rising from his seat, said to Mr. Brown, 'Well, sir, if you will not advance me the money, I will go to the Secretary of State's office, and cause it to be entered, that it may remain *res perpetua memoria*, that I, John Fitch, inventor of steamboats, having exhausted all my means in carrying my invention into perfection, needed four hundred dollars to complete my work, and give evidence to the world of its value and utility; that I called upon you, John Brown, Member of Congress from the Kentucky district, in the State of Virginia, to loan me four hundred dollars, to complete my machinery and give unanswerable evidence of the utility and importance of my invention, and that you refused it.' Mr. Brown said, 'You may do so, Mr. Fitch, if you please.' Fitch then said, 'Good morning, Mr. Brown, Member of Congress from Kentucky district,' and Mr. Brown replied, 'Good morning, Mr. Fitch, inventor of steamboats.' Mr. Brown never saw Fitch again."

Discovery of a New Iron Mountain.

The existence of an immense iron mountain, almost on the very shores of Lake Superior, outrivaling the famous iron mountains of Marquette, seems almost too marvelous for belief, yet we can assure our readers, upon the most irrefragible testimony, that the fact is even so. That such a wonderful mineral deposit should remain undiscovered until a very recent date is the most remarkable feature of the whole affair, and shows how great and diversified is the natural wealth of that world-renowned region, contrasted with the tardy pace of its development, particularly on the Canadian side, where the newly-discovered mine is located. At the distance of only about forty-five miles from Ste. Marie, this mountain lifts its frowning summit to the altitude of six hundred feet above the level of the lake, being about twice as high as the iron mountains of Marquette.

The first examination was made in July last by Prof. S. P. Duffield, of Detroit, who, from the general features, came to the conclusion that the range was identical with that of Marquette, and in order to satisfy himself on this point, he visited Marquette to get the range, by which his theory was found to be fully sustained. A company was subsequently formed under the name of the "Batchawanung Iron Company," which obtained a patent from the Canadian Government for 3,200 acres which comprises all, or nearly all of the mineral tract in question. The ore is of the very finest quality, corresponding to the ores of the Marquette mines, and extending through a range of several miles, in deposits many feet in thickness. It is so plentiful that by no human agency can the supply be exhausted for hundreds of years. Of the unequalled richness of the ore we are enabled to speak definitely. A quantity which was taken from the depth of only fifteen feet from the surface, and smelted in a common blast furnace by Professor Duffield, realized 60 per cent of pure iron. When we remember that 30 per cent is a good working average, the richness of the newly-discovered ore will be fully apparent. At a greater depth from the surface, its purity will of course be on a corresponding scale, in accordance with a well-known mineralogical law. In addition to the professional examination, which was conducted by Mr. Forbes, a very large extent of land was thoroughly surveyed and mapped; the Batchawanung river was "meandered" for nine miles from its mouth, soundings were taken in the bay, and an excellent harbor was located; and, finally, a railroad line was run from the harbor to the future mines, by the experienced skill of Prof. Duffield, assisted by Mr. Forbes. Prof. Duffield reports that this line will not be over five miles long, and that it cannot be constructed without heavy grades. The harbor is a good one, sheltered from all winds, accessible by a simple channel to large vessels, and sufficiently extensive to accommodate the largest commerce. He also states that the railroad from the mines to the harbor, will have a down grade of 75 feet to the mile. The cars would thus have a descending grade when loaded and an up grade when light.

We understand that the reports of Prof. Duffield, Mr. Forbes and Messrs. Adelberg and Raymond will soon be given to the public, and that steps will immediately be taken for the development of the Batchawanung district.

The mineral was first discovered a year ago last winter by an Indian named Caucosh, but who is now known by the *soubriquet* of "Pewabie," signifying iron. In trapping he came to a tree that had been blown down, whose upturned roots revealed to view the previously hidden wealth. The news was communicated to a half-breed named Peter Bell, who revealed the secret.—*Buffalo Advertiser.*

At the agricultural competition of Vaucluse, in France, held at Thor, last summer, the prize for plowing was carried off by a young woman twenty years of age.

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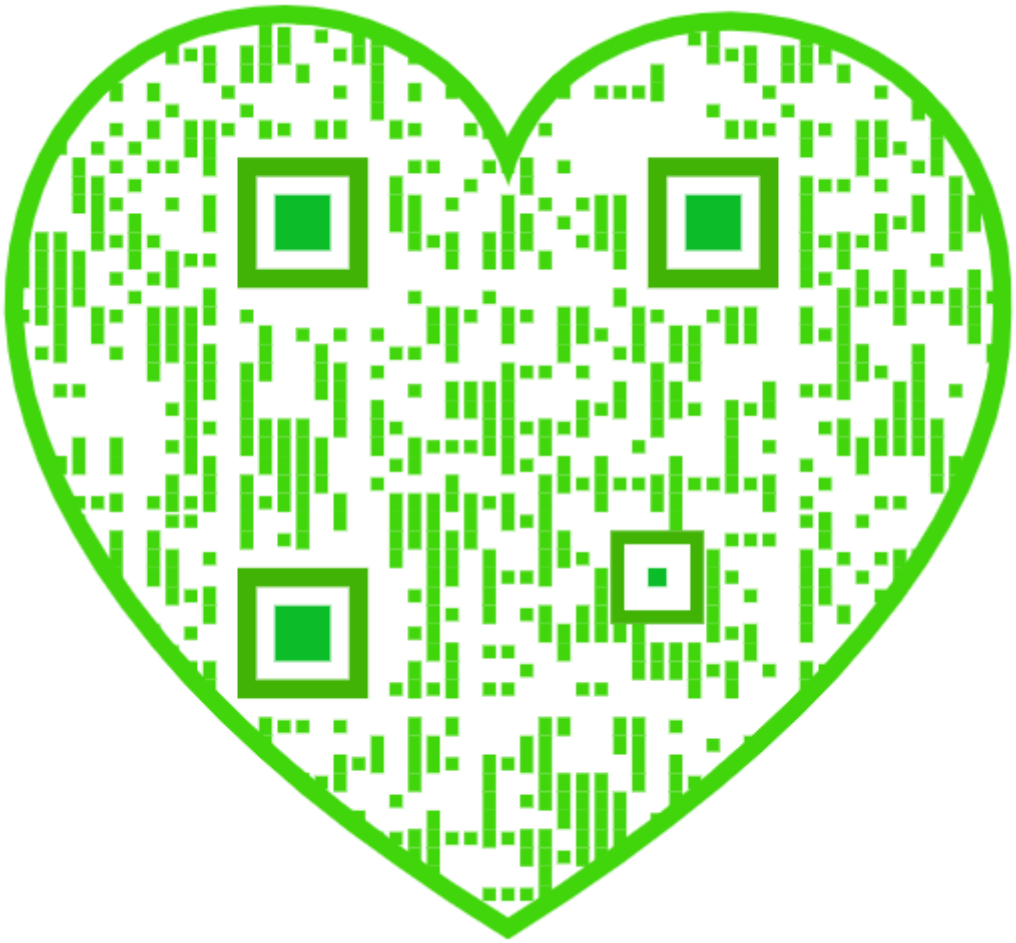

Saving Silver by Photographers.

In reply to some correspondents, we publish the following remarks on this important matter, by the editor of the *American Journal of Photography*, the very highest authority on all questions connected with this art.

"——Save the silver, has been a frequent recommendation of this Journal; and the advice is not given in vain. There are very many of our readers who, at a trifling expense, recover more than one-half of the silver which they purchase. But there are others who, at much labor, save very little; what is the matter with these latter? We have lately seen two lots of 'waste,' which contained the savings of two thriving galleries, which had been produced in the space of nearly a year; and the amount of silver in them did not pay the cost of separation. On inquiry, we learned that the method of saving in both cases was substantially the same, and was the one best calculated to collect a good quantity of dirt, while it permitted the silver to get away.

"There is a fundamental principle which should be had in view by those who wish to save silver easily, and that is that the solution from which silver is to be precipitated should be as strong as practicable. If any one has a doubt of it, let him try a few experiments: Dissolve 60 grains of nitrate of silver in a barrel of water; now recover the silver. Add to the barrel of solution of nitrate of silver, 60 grains of salt previously dissolved in a small quantity of water. The nitrate is now completely converted into chloride of silver. Now the chloride is a solid body quite insoluble in water, and yet in this case the fact does not clearly appear. The water is scarcely turbid, it goes through a filter unchanged and without leaving anything on it. Leave the whole mass of water at rest for a day, and the lower stratum will be slightly different from that on the top, but yet the chloride of silver is still entirely suspended. Let the water rest a month, and the precipitate will have fallen to the bottom, and by carefully decanting the water a considerable part of it might be recovered. If, instead of six grains of salt, a handful been thrown in, no precipitate would ever appear, for in that case it would have been completely dissolved. If any one will try the experiment during the pressure of business of his gallery, he will be thoroughly satisfied that it is not worth his while to save silver from very weak solutions. Dissolve the sixty grains of silver in half an ounce of water, convert into chloride, and the chloride can be recovered completely in a few minutes. From weak solutions precipitates are light and fine; from strong solutions, heavy and course.

The error of silver savers who fail, is the unnecessary dilution of solutions. There are various jimcrack contrivances which the inventors claim will keep back the silver, however much water passes through them; and they place them in sinks where all the washing water passes; these humbugs ought to be abolished. A two gallon earthen jar set near the developing place will save all the silver that is worth while to save from the development in the largest establishment in the country. Let the waste developer and the first washings, not to exceed two or three ounces for a 4-4 plate, go into it; every morning pour off the water. A large vessel may be more convenient, but there will be risk of putting too much water into it."

A Smokeless Furnace.

There is in operation at the engineering works of Messrs. Moreland, London, a furnace patented by Mr. E. B. Wilson, which is said to economize fuel to a considerable extent, and which may be rendered almost smokeless. This furnace, which is used for heating rivet bars, has no fire-bars. It consists of a chamber or box at the back, to contain the fuel, and a reverberating oven connected therewith, the flue being at the other end of the oven, and connected with the ordinary chimney-stack. The coals are ignited in the box, to which they are supplied about twice a day. As there are no fire-bars in the furnace, the air enters upon the surface of the fresh coal in the box, causing a downward draft, as the floor of the reverberating oven slants downward from the coal-box. The gas is thus slowly and continuously distilled until it comes in contact with the lower stratum of burning coals, when it receives its proper dose of caloric, and passes into the reverberating oven, heating any material that may be placed there, and passes downwards by the flue which descends at a point a little inwards from the mouth of the oven.

The principle adopted seems to be that of turning a common fire upside down, not unlike "the *Builder's* Fire," or a furnace back foremost, so that the fresh coal is applied at that end whence the smoke of its first ignition goes through the fire and is consumed, instead of being placed on the end of the fire, whence the direction of the draft carries it off as soon as evolved. The principle is very simple, and probably efficient, though not novel.

Effects of the Excessive Use of Sugar on the System.

Dr. Champouillon communicated the result of his observations on the effects of the excessive use of sugar on the system. So far back as the year 1846, the author undertook a series of experiments on himself, in order to supply the Minister of War with information as to the possibility of replacing salt by sugar in the preparation of the preserved meats destined for the use of the army during a campaign. In accordance with his instructions, M. Champouillon strictly confined himself to the diet which may be accidentally enforced on the garrison of a besieged city by the hardships of war, and for several days in succession lived on the following rations: sixteen ounces of beef preserved in sugar, and four ounces of biscuit; water was his only beverage. Various phenomena supervened in the following order: thirst, sinking at the stomach, distaste for food, nausea, acid regurgitation, epigastric pain, diarrhœa, prostration and syncope.

"I carefully watched these symptoms," says M. Champouillon, "and the loss of appetite and nausea indubitably proceeded from the absence of variety in my diet; whereas, the thirst, heartburn, epigastric pain, and diarrhœa were clearly referable to the difficulty of digesting cane sugar. In proportion to the impression produced by this substance on the organs of taste, it clogs the palate, and destroys natural appetite. This excessive indulgence in sirups, sweet-meats, pastes, and highly-sweetened diet drinks brings on distaste for food, and annihilates the digestive powers, especially in cases of pulmonary consumption." After expatiating on the transformation of cane sugar into glucose, in consequence of its contact with the acids contained in the gastric juice, and on the injury caused by the increased activity imparted to the functions of the stomach by frequent repetition of the process, M. Champouillon showed that in addition to the inflammatory congestion thus occasioned, glucose powerfully contributed to the establishment of a plethoric condition of the system, and that the prevalent opinion that the excessive use of sugar tends to cause pulmonary irritation and a disposition to atrophy, is but too well justified by facts. In support of this view the author adduced two interesting cases, one of apoplexy, the other of hæmoptysis, in which the agency of this cause was distinctly evident.

"I have often remarked," said he, "in thirty-three years' experience of tubercular disease, that the cough, hectic fever, and night-sweats are increased by the fondness of the patients for sweet substances. I conceive this to be the natural consequence of the combustion of the glucose in the system, a phenomenon which necessarily implies the production o water, carbonic acid, and heat. It is a well-known fact that three and a half ounces of sugar consumed in the human body evolve an amount of heat equivalent to what might be produced by the combustion of thirty-two grains of charcoal. MM. Favrot and Silberman have shown that fifteen grains of charcoal are sufficient to impart one degree (cent.) of heat, to eight kilogrammes, or sixteen pounds of water. If the capacity of the human body for caloric is the same as that of water, three ounces and a half of sugar will, in a subject weighing seventy-five kilogrammes (12½ st.), raise during their combustion the temperature of the body four degrees and a half, centigrade."

The practical conclusion of this paper is, that it is desirable to reduce within as narrow limits as possible the consumption of sugar, especially in cases of tuberculosis, and to replace that substance by honey, or a decoction of liquorice.

The Use of Fuzes.

All spherical shells, except the 24 and 12-pounder howitzer and all shrapnel, are fitted with the "navy time fuze." This fuze is made of a composition driven in a paper case, and then inserted in a metal stock, which screws into a bouching fitted to the shell. The composition is covered with a "safety cap," which protects it from moisture and accidental ignition; also with a water cap of peculiar construction, intended to protect the flame from being extinguished on ricochet. A "safety plug" at the lower extremity prevents the communication of fire to the powder in the shell in the event of the accidental ignition of the fuze after being uncapped. It is strictly forbidden to show or explain to foreigners or others the construction of any fuzes, except so far as may be necessary for the service of the guns. These fuzes are of 3½, 5, 7, 10, 15, and 20 seconds time of burning; which is supposed to offer a sufficient variety for most of the exigencies of service All shells are fitted and issued from the shell-houses, with the 5" fuze, which is to be regarded as the general working fuze. For greater or less distances this fuze may be drawn and any of the others substituted. The navy time fuze is rarely extinguished by several ricochets on water; and near the end of its flight, when fired direct, frequently acts by concussion. The fuze used should not be of longer time of burning than requisite to reach the object; the shorter time are of quicker composition, therefore more certain; also in firing on ricochet the shell may sink short of the distance necessary for its explosion, and consequently be supposed to fail.

For special firing, as for example, at masses of uncovered troops, any of these fuzes may be shortened. To do this, unscrew the water cap, and back the paper case out from the lower end with a drift and mallet; cut off from the lower end with a fine saw, or sharp knife struck with a mallet, the proportional part required, and insert the upper part in the stock, forcing it down with a few gentle blows with the drift; screw on the water cap. The Borman fuze is fitted to the 24-pounder and 12-pounder howitzer ammunition, and all shrapnel. It has also been fitted to certain shells used for special firing. The length of fuze is the limit of the distance within which this fire is effective. This fuze is cut, or rather opened, at the required number of seconds, cutting close to the right of the mark on the index plate. The cut should be made down to the plane of the table, in order to expose the composition, and is best made at two or three efforts instead of trying to effect the cut at once. This fuze should be carefully explained, as shells have been taken from guns with the cut made into the priming magazine, which would explode them at the muzzle.

The best effect of a percussion fuze is obtained by firing into a mass of timber. They frequently fail if fired into a bank of soft earth, or other material which does not offer a sufficiently sudden resistance; also if fired at high angles of elevation, owing to the fact that the shells do not generally strike point foremost. Time fuzes are also very unreliable in rifle guns, owing to the fact that the expanding class of projectiles cut off the flame from the fuze.—*Ordnance Instructions of the U.S.N.*

Gun Cotton.—Trials are still going on with gun cotton, and if its deterioration can be prevented there can be little doubt that it will prove a most valuable addition to, if not a substitute for, gunpowder. We have already recorded its power in the destruction of an Armstrong 110-pounder, when used in a shell, and we may hence judge that the armor plates, which are little affected by the explosion of powder shells, will be cut in two by shells filled with gun cotton. It is true that gunpowder deteriorates both from damp and motion, but not in so great a degree from exposure to the atmosphere as gun cotton. On the other hand, gun cotton may be carried wet in tanks in perfect security, and possesses, both in power and extreme lightness and cost, and in not fouling the guns, very great advantages over gunpowder.—*Army and Navy Gazette* (*England*).

Sydney Smith once remarked, "After you have written an article take your pen and strike out half of the words, and you will be surprised to see how much stronger it is."

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INDIA-RUBBER CLOTHES-WRINGER.

One of the most useful inventions that has made its appearance to confer blessings upon toiling womankind is the clothes-wringing machine, in which rubber rollers are employed. It saves much hard labor, and much wearisome twisting, and it is, therefore, an interesting question how far the use of such elastic rollers is monopolized by any one company. The question is frequently put to us, whether parties who purchase india-rubber hose or tubing can, at the time of such purchase, be limited in its use to any one specific purpose. In the case of the Washing Machine Company *vs.* Earle, tried in the Circuit Court, in New Jersey, before Justice Grier, in 1801, it was held that—

"A patentee may hold a close monopoly of his right, or he may grant out his entire right; but he cannot divide his right into parts and grant to one man the right to use it in its connection with, or application to one thing, and to another in connection with a different thing, to such an extent as that purchasers from any of these persons may not use the fabric purchased exactly as they like, and, if they please, in violation of what he has supposed were rights not granted by him.

" Goodyear, the patentee of vulcanized india-rubber, might have prevented any person from using his fabric for any purpose. But if he grants to A the exclusive right to use it to make 'wringers' only, and to B the right to make 'tubes' only, A cannot restrain C, who has bought tubes, from converting them into wringers by any process whatever that he, C, pleases. Neither can Goodyear."

This decision is published on page 501, Law's Digest of Patent Law Cases, and we are not aware that the Supreme Court has ever overruled this decision.

Link Motion--The Relative Proportions of Slides and Steam-ports.

Mr. Albert Aston, of the Naval Engineering Corps, in a paper to the *Franklin Institute Journal*, has the following interesting information:—

"The best way of finding the position of the link for intermediate points of cutting off, is as follows:—When the engines are set up and the valve-gear adjusted (the valve-chest cover being off if practicable), turn the shaft until the cross-head arrives at the point desired. Then move the link until the steam-port is just closed, and mark the position of the catch on the guard, or whatever other device may be adopted. Next, turn the shaft until the cross-head is in a corresponding position on the return stroke; move the link until the port is closed and mark the position of the catch. Cut the notch midway between the marks on the guard and proceed in the same manner for the other points of cutting off.

" The only remaining question is that of the exhaust lap. If the exhaust lap was equal to the steam lap, the exhaust port would be closed at the same time as the steam-port, which would cause excessive cushioning. If, on the contrary, there was no exhaust lap, the exhaust port would be open long before the steam-port, and, consequently, before the piston had arrived at the end of its stroke. The loss due to this too early release of the steam is more serious than that due to cushioning, for it is all a loss of power; whereas the compressed vapor partially or wholly fills the port and clearance which would, otherwise, have to be supplied with fresh steam from the boiler. In fact, if the expansion were carried down to the back-pressure, there would be no loss of economic effect by the cushioning, however excessive. The best relative proportion which these two losses should bear to each other, is, evidently, that in which the sum of the two would be a minimum. This could be easily determined by means of the differential calculus if the curve traced on the indicator card by the escaping steam, and which is dependent on the proportion between the valve-opening and the cylinder capacity, and the speed of the piston between the point of release and the end of its stroke, could be known, and if the compressed vapor followed Mariotte's or any known law; but as the exhausting curve cannot be easily determined, and as the required condition is never fulfilled by the cushioning steam, accurate calculation is out of the question. It should be remembered, however, that the valve should open long enough before the end of the stroke to allow the piston to commence its return stroke with the maximum vacuum, and that the cushioning is not perceptible on the indicator card until some time after the exhaust-port is actually closed, owing to the rapid condensation of the compressed vapor; and were it not for the atmospheric air mixed with the steam in the cylinder, the cushion curve would be much less than it is actually found to be, and a much earlier closing of the exhaust would be practicable. The problem is also affected by the absolute amount of back pressure; but it is found, from the inspection of a large number of indicator cards, that the most satisfactory diagrams are obtained when the exhaust lap is about one-half the steam lap.

"It is practically desirable to keep the stroke of the valve as small as possible, the steam-ports should be made as narrow as possible, the requisite area being made up by length. This will cause more resistance to the passage of the steam, but the area can be slightly increased to compensate it.

"As the steam is not required to enter the cylinder as quickly as it should leave it, the steam side of the valve should only uncover about three-fourths of the width of the port. The exhaust side should always give the full opening, which it will do if the exhaust lap is properly proportioned to the steam lap. The opening of the port on the steam side of the valve, is what must be used with the foregoing formulas. A good rule for finding the area, in square inches, of the steam-port, is, to multiply the square of the diameter of the cylinder, in inches, by the velocity of the piston in feet per minute, and divide by 4,000.

"It might also be observed, that the length of the link, from center to center, should be at least three times the stroke of the valve, and that the best radius for its center line is the distance from the center of the pin to the center of the eccentric."

General Butler's Canal at Dutch Gap.

This work, while in progress, and all concerning it, cannot fail to be of interest. From persons well acquainted with the geography of Dutch Gap, through which the canal is being cut, we have learned some facts which will enable the reader to understand the character and magnitude of the work Butler has undertaken.

The isthmus known as Dutch Gap, which connects Farrar's Island with the mainland on the north bank of the river, is exactly two hundred yards across, being eighty feet high on the western side, and sloping down to the river on the east channel of the river, which runs against the west side, striking it obliquely just off the shore. At this point the water is from ten to fifteen feet deep. The channel being on this side will greatly aid Butler, should he ever complete his canal, as, had it been in the middle or on the opposite side of the river, he would have been obliged to construct a huge breakwater to turn the the stream into the canal. We learn he is cutting diagonally through the Isthmus, being one hundred yards below the narrowest point, and designing to come out at a point where the canal strikes the bank. This will give his canal, if ever finished, a length of about three hundred yards. As we stated on a previous occasion, we have reason to believe that the canal proper has been begun to be cut to the water's edge, which is a secondary preliminary, having not yet been more than two-thirds completed.—*Richmond Examiner.*

Value of a Patent.

The English *Oil Trade Review* says:—The patent right taken out by Mr. James Young, the discoverer and first manufacturer of paraffin oils in commercial quantities, expires during the present month. All the manufacturing trades in Great Britain have been looking forward with great interest to the time when Mr. Young's patent shall be void, as there is very little probability, if any, that a renewal of it will be obtained. Great preparations have therefore been made during the past twelve months for the erection of works in all suitable parts of the kingdom, to be devoted to the manufacture of paraffin. An enormous amount of capital has thus been invested.

An experiment of a highly interesting and important character—that of breeding salmon and stocking the Dennysville River, in Maine, with those fish—has been carried on for several years, and we learn from the Machias *Union* that the return of salmon to the river proves the enterprise a complete success.

MISCELLANEOUS SUMMARY.

Electro-Plating by Magnetic Machines Abandoned.—We stated sometime since that electro-plating by means of magneto-electric machines was being conducted on a large scale at College Point, Long Island, by Mr. L. L. Smith. We now learn from Mr. Smith that he has returned to this city and resumed the use of batteries. The machines did very good work, but the cost of steam power to drive them was greater than the cost of acids and metals for the batteries.

The sorghum crop of the lower townships of Bucks County is quite large. There is scarcely a farmer who has not raised enough to supply his family. The manufacturers of molasses are kept busy. At some of the mills there is enough cane on hand to keep them running till Christmas. The crop is a very profitable one, yielding about 160 gallons per acre, which sells at $1 30 per gallon by the barrel; cost of manufacturing, 30 cents per gallon, which leaves a clear profit of $100 per acre.

"The Telegrapher."—We have received the two first numbers of *The Telegrapher*, a monthly journal published at 145 Broadway, New York, by the National Telegraphic Union, and devoted to the interests of the art. It is handsomely got up, and is conducted with ability, the editor and contributors being practical men of large experience in the profession. We wish it success, as such a paper, we imagine, has long been needed as the exponent of telegraphic matters. Terms $2 per year.

High Velocity.—There was a small model of a turbine wheel on exhibition at the San Francisco Fair, which revolved at the enormous velocity of five thousand times in a minute—a motion so rapid that it does not appear to move at all, till the finger is placed on the surface which creates a heat by the friction equal to red-hot iron.

An unique arm-chair has been made at Norfolk by one of the oldest acting masters in the naval service, for the National Sailors' Fair. It is made wholly from sunken ships, has miniature guns for arms, and is altogether one of the most novel articles contributed to the fair.

Exhaust Lead and Steam Lead.—In an abstruse paper on the "Cinematics of the Slide Valve," published in the *Franklin Journal*, Mr. Albert Aston of the navy, states it is found from the inspection of a large number of indicator cards, that the best results are obtained when the lead on the exhaust side of the valve is half that on the steam side.

Petroleum as Salad Oil.—A recent article says:—Every day new uses for this substance are being discovered. Its use for culinary purposes even is being discussed. We know of one gentleman who eats it on salad, and prefers it to olive oil!

A practical furrier says:—"The best way to keep moths from furs when putting them away in the spring is to beat them and comb them; it is better than pepper, snuff, tobacco, or anything of the kind."

An unusual abundance of birds of prey, such as hawks, winter falcons, &c., of large size, has been remarked this fall throughout various parts of the country.

The steamer *Daniel Drew* recently ran from Albany to this city in 6 hours and 23 minutes; the distance is 160 miles.

The celebrated Blackfriars Bridge, at London, is in progress of demolition, and a new one is to be erected in its place.

King's Notes on the Steam Engine and Bourne's Catechism are good books for engineers.

SPECIAL NOTICE.

Wm. O. Grover & Wm. E. Baker, of Boston, Mass., have petitioned for the extension of a patent granted to them on Feb. 11, 1851, for an improvement in sewing machines.

It is ordered that the said petition be heard at the Patent Office, Washington, on Monday, Jan. 23, 1866.

All persons interested are required to appear and show cause why said petition should not be granted. Persons opposing the extension are required to file their testimony in writing at least twenty days before the final hearing.

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OSBORNE'S PROCESS OF PHOTOLITHOGRAPHING.

If gelatine is mixed with bi-chromate of potash, and exposed to the light, it becomes insoluble. If a portion only is submitted to the action of light, that portion becomes insoluble, while the remainder that is kept in the dark preserves its property of solubility. This action of the chromic salt has been taken advantage of by Dr. J. W. Osborne, of Australia, for copying maps, drawings, and engravings on lithographic stones by the action of light. The following description of his process was given by Dr. Osborne in a paper read before the Royal Society of Victoria:

"In the first instance, a sheet of paper is prepared with albumen, in the usual way known to photographers; it is, when quite dry, passed through a copperplate or lithographic press, upon a polished steel or copperplate, by which operation it receives a very smooth and regular surface; it is then coated on the same side with a solution of gelatine, to which an addition of bi-chromate of potash has been made; this is then carefully dried in the dark, and again passed through the press, to insure the finest surface. This operation completes the preparation of what I shall call the sensitive paper. Having made a negative of the original map, drawing, or engraving, bearing the desired proportions to it, I place a suitable piece of the sensitive paper, just described, under and in close contact with the map, and the whole is exposed to daylight in such a way that the luminous influence passing through the transparent parts of the negative, shall strike directly upon the prepared surface, while the greater part of the paper is protected from its influence by the dark parts of the negative, which correspond to the white places on the original map. In the presence of the organic matter, the actinic agency effects the decomposition of the bi-chromate of potash, and the liberated nascent oxygen in all probability reacts upon the gelatine, altering its chemical characteristic in a peculiar manner. The visible effect after removing the negative is the formation of a picture in brown upon the clear yellow of the paper, corresponding to the transparent portions of the negative, or to the black lines upon the original drawing. This positive photographic print is next covered with an even coating of lithographic transfer ink, by passing it through the press, face downwards, upon an inked-in lithographic stone. The pressure causes the whole of the sensitive surface to lay hold of the ink, and bear away with it an even coating, hiding the brown photographic positive from view. The altered parts of the gelatine, which have been exposed to the luminous action, appear to be possessed of a certain amount of affinity for the grease of the ink, so that they will be found to retain it with considerable tenacity. The next operation is to coagulate the albumen which still exists under the prepared surface. This is done by floating it upon boiling water, with the paper-side downwards. A subsequent soaking for a short time causes the unaltered gelatine to swell in such a way as to raise the ink with it from the paper, and a slight amount of friction, with a sponge or other soft substance, removes the superfluous ink from all parts of the inked print which correspond to the white parts upon the original document. When the lines all appear clear and well defined, boiling water is poured over the whole, to remove the last traces of gelatine, and the print is dried. We are now possessed of a *bona fide* lithographic transfer—that is, a drawing in greasy ink, of such a nature that it admits of being transferred to the stone in the ordinary manner, by simply inverting it thereon, and passing it through the press; the albumen, which will be found to have withstood all the washing, acting as the adhesive substance under the ink to prevent the paper slipping on the stone. The whole of these operations need not occupy more than from two to three hours."

We have seen samples of the lithographs produced by this process, and they were very fine. The process is only adapted to copying pictures in the line, such as wood cuts, copperplate engravings, and pen-and-ink drawings. The half tints of ordinary photographs or mezotint engravings cannot be satisfactorily produced by it. Its great use is in copying maps on either larger or smaller scale, the copy being reduced or enlarged in the camera with perfect accuracy.

The process has been patented in this country as well as in Europe, and has been employed on a pretty large scale by the governments of Australia and Prussia.

Bismuth.

The high price attained by this metal was due to a circumstance which would scarcely be suspected in the present day. A company was formed in London, under the direction of a foreigner, for the purpose of making gold. Very large premises were taken, and much apparatus placed in position to carry out the most recent attempts at transmutation. Bismuth was to have entered largely into the process, and all that could be obtained was purchased by the company regardless of price. Of course, no gold has been made, and to save out of the wreck as much as possible, the deluded shareholders are cautiously selling their stock of bismuth, so as to obtain as high a price as possible, and thus by legitimate process convert it into gold. Few things can show more strikingly than this does the deficiency of knowledge among a large and respectable class of people. It was not long since that the writer of this notice was positively told by some gentlemen that they were about to extract aluminum from quartz, and if embarking a large sum of money in so wild a scheme may be regarded as a proof of their conviction that this was possible, that proof certainly existed. Still more recently a man, supposed to be an experienced miner, has returned from abroad, bringing with him what he regarded as a very fine specimen of tin, whereas they are only crystals of wolfram (tungstate of iron), and consequently valueless. Such instances surely show the necessity of making some of the sciences part of our ordinary educational system. Attention is again directed to the combination of tungsten with steel. Some years since Mr. R. Oxland patented a process for separating wolfram (tungstate of iron) from tin, and it was proposed to employ the tungstate of soda obtained in the process as a mordant, and the metallic tungsten as an alloy with iron. M. Jacob subsequently made steel, with tungsten in its composition, and carried out some large and apparently satisfactory experiments at Sheffield and Austria. The results were so promising that M. Jacob gained possession of nearly all the sources of wolfram in this country. For several years, however, nothing has been heard of this alloy. Now M. Le Guen has solicited attention to what he calls wolframed pig-iron. Experiments have been made at Brest, and the pig tested was found to offer a greatly increased resistance when less than 2 per cent. of wolfram had been added to the iron. Another description of pig-iron, formed of one-third of best old English pig and two-thirds of the fragments of old cannon, with German wolfram mixed in the same proportion, shows an augmentation of resistance equal to about 68 kilogrammes per square centimetre. Numerous other experiments of a similar character were made, the result appearing to be in all cases favourable to the wolfram pig-iron. There is much difference in the character of the tungstate of iron. The French wolfram, containing a little arsenic and sulphur, is not equal, even after roasting, to the German mineral, which is very pure.—*Quarterly Journal of Science.*

Ginseng.

This plant, associated with opium and China in the minds of most people, is a native of this country as well as of Asia. The *Panax quinquefolium*, or ginseng, is an annual plant, the root of which is held in high esteem by the Chinese for its supposed medicinal qualities. Its name, panax, from *panacea*, was given to the genus by Linnæus. In this country, it is found growing in a wild state in Tennessee, Virginia, and several of the Western States, and also in Canada. It is collected in large quantities in Ohio, Minnesota, and Wisconsin, the roots carefully dried and sent to this city for shipping to China in payment for silks and teas. The dried root is now selling in this market at $1.25 to $1.35 per pound. See what a Dane County (Wisconsin) exchange says of it:

"'On to Richmond!' may be the watchword along the York and James rivers, but *Ginseng* is the cry in Menomonie and the surrounding neighborhoods. We are told that the speculators are paying 15 cents a pound for it in a green state—it is selling in New York for $1.15, wholesale. Dunn and the surrounding counties are full of the desirable root, and men, women, and children are digging it; and we do not hesitate to say, if 'John Chinaman' does not have a sufficient supply of the 'narcotic' next year, it will not be from a lack of the efforts of the people of this neighborhood to furnish him the material to manufacture it from. We are informed that, in this early part of the season, $8,000 have already been paid out in this county for Ginseng."—*The Horticulturist.*

Fatal Explosion of Fulminating Mercury.

The *N. W. Times* publishes the following communication:

MR. SOMERBY—*Dear Sir:*—It is with deep agony and sorrow that I have to inform you of one of the most heart-rending and terrible accidents that few ever describe, and which has sent my esteemed employer to an untimely grave, and plunged his own and his father's family into grief and sorrow that knows no comforting.

We had been engaged for several days back in taking account of stock, and had nearly finished when Mr. Parry, who was engaged in taking an account of the business, took up a 1 oz. vial of Fulminating Mercury for the purpose of weighing it, but before doing so, he undertook to remove the glass stopple from the vial, and the friction produced by its withdrawal caused a small portion of this dangerous compound (that had insinuated itself between the stopple and the neck of the bottle) to explode, which communicated with the balance, causing an explosion of a fearful nature, tearing his right hand clean from his wrist, stripping the flesh from the fingers of his left hand, destroying one eye and ripping open the abdomen—his bowels falling out on the floor, presenting one of the most ghastly sights that imagination can conjure up. Such was the force of the explosion, that articles he had in his pockets, such as keys, some coins, &c., were indented and forced to a distance of fifteen feet from him.

This fearful explosive is the matter with which gun caps are filled. Its greatest force struck him in the abdomen, tearing and lacerating him in a fearful manner. He recovered his senses in a few seconds sufficiently to communicate the way the accident occurred, and the physicians, who arrived in a few moments after, did all that they could to save him; and as soon as he could be removed he was carried on a bed to his residence, where he died about four hours after the explosion.

Mr. Parry is a great loss to the community as a business man, and to his numerous friends. As a private citizen his death will be mourned by every one. STANLEY STOUT.

La Crosse, Wis., Oct. 21, 1864.

New English Rock Drilling Machine.

Lately a very ingenious machine has been invented by Mr. Westmacott, a partner of Sir William Armstrong, for the purpose of drilling holes, instead of doing it by manual labor. This machine is worked by hydraulic power, and the inventor has taken for his model the operations of a man in drilling, the various movements being exactly copied; first, the drill is pressed against the stone to be operated upon, and then a blow is struck, the drill is then withdrawn a little, and also moved a little round, again pressed against the stone, and struck, and so the operation is continued. All these operations are performed by the machine, which appears to be a very ingenious one. It is capable of striking from 150 to 200 blows per minute, and the drill makes one revolution during the striking of fourteen blows; its rate of progress (the size of the hole being $1\frac{1}{8}$ inch) is 2 inches per minute, or 20 inches in ten minutes, which has been done in repeated trials. So that, taking this rate of progress, it is capable of performing work equal to the labor of $12\frac{1}{2}$ men, presuming that a man will drill in this stone 8 feet per day, which is a fair average; and the machine to bore 100 feet per day of ten hours. There can be no doubt that this machine will prove of great value.

RECENTLY the propeller *Ontonagon*, on Lake Michigan, broke her shaft, and the large mass of iron came crashing down among the timbers and stove a large hole through the bottom, into which the water rushed with fearful rapidity.

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Correspondence

The Ames "Union" Gun a Practical Triumph.

MESSRS. EDITORS:—In defiance of the theories of ordnance officers, of both the army and navy, the value of cohesion as a mechanical means of obtaining strength, is being fully developed in the Ames wrought-iron gun "Union." This gun aptly illustrates the value of two antagonizing principles in politics and mechanics—the "Union" against secession as a principle of strength, and wrought-iron against cast-iron as a material for guns. The granulous crystalline properties of cast-iron render it unfit to be brought under the separating tendencies of powder, a fact beginning to be realized in the loss of life from the bursting of cannon.

The trial of this "Union" gun has been in progress since Sept. 1st, under direction of Gen. Gilmore, Major Laidley and Commodore Hunt, who, after witnessing its tenacity under the most trying circumstances of excessive charges of the strongest powder, with projectiles which did not and could not be made to fit any gun, from their roughness of manufacture, expressed a desire to see how these guns were made, and proceeding to the iron-works at Falls Village, satisfied themselves of the value of the material and mode of making the gun, and returned with different impressions. After firing 600 rounds the Commission determined to take ranges. The time selected was the 20th of October—a fine day if we except the fresh breeze blowing from the gun toward Long Island shore.

Major Laidley had taken position near the gun with a plane table to note the angles at which the projectile struck the water. Commodore Hunt was at Point-no-point, E.S.E., two miles distant, with a plane table to note the angles, from his position, at which the shot struck the water. Another held a stop-watch to note the time between the flash of the gun and fall of the projectile. Observation was also taken on board of the "Light-ship," ten miles distant, almost directly in range of the gun, by Colonel Morris at the request of Major Laidley. Immediately in front of the gun, about 100 feet distant, was a large embankment of sand within an inclosure of posts and planks. Several of the projectiles of the morning firing were seen and noted on board of the "Light-ship;" one of them fell about two and a half miles from the vessel, or more than seven miles from the gun. In this instance the projectile was seen to strike the water two seconds before the report was heard. The gun was fired 45 times during the day, the charges varying from 25 to 30 pounds of No. 7 powder—the elevation varying from 30 to 34 degrees. The projectiles were of the Hotchkiss pattern, the shell averaging 104 and the shot 125 pounds; some having three flutes, others five, and others none; the workmanship of these projectiles was not creditable to the maker, and it is believed that with cylindrical projectiles of the same pattern, properly made, a range of an additional mile would have been obtained with the same charge of powder. The greatest time of flight was 43 seconds; the fall of the projectile in the water could be distinctly seen. Thirteen charges were subsequently fired with four patterns of projectiles. The two first were Gen. Gilmore's pattern, weighing 151½ pounds each, with 25-pound charge and 13 degrees elevation. The range was very good for the small angle of elevation. Four shells of the Stafford pattern (with an improvement upon them) weighing 110½ to 112 pounds, were also fired, two with 13 degrees, another with 17, and another with 23 degrees elevation, and, with 20 pounds of powder, obtained a very good range, the two latter in 26 and 27 seconds respectively. Two solid subcaliber shots of the bolt pattern were also fired, designed for penetration. The remaining five charges were with projectiles of the Hotchkiss pattern, which terminated the work of the day, the powder being exhausted. The gun has been fired 700 rounds officially and 13 times unofficially, and the commission are unanimously of the opinion that "no gun ever fired so well, or stood so much as this gun;" they recommend that it be bored out to eight-inch caliber and put into service. Gen. Butler has requested the President to permit him to have some of these guns to throw shell into Richmond. J. G. R.

New York, Nov. 3, 1864.

Preserving Potatoes in Molasses.--Government Vinegar.--Repeating Rifles.

MESSRS. EDITORS:—Your issue of Oct. 8th, contains a statement made by Professor Reed, before "the Polytechnic Association," that he had seen potatoes which had been preserved in molasses "brought back from a two years cruise which were perfectly sound." On calling the attention of two old whalemen who have "cast anchor" on this part of the Prairie State to this publication, both agreed that they were familiar with the practice of using potatoes and molasses as an anti-scorbutic, but that the potato became worthless, having parted with all its properties, nothing remaining but a tasteless insipid mass of vegetable matter. One of these parties has made two whaling voyages, and gives the process of making what the whalemen call "potato wine." Molasses casks are filled with potatoes and molasses; in the course of some months the molasses has extracted all the properties of the potato, and fermentation accelerated by the motion of the vessel has taken place, producing a palatable liquid, or "potato wine," which is served out to the crew, and which is claimed to be a preventative of scurvy. Now I would like to find out which of these statements is correct; or are they both to be relied on? Cannot some of your correspondents who are practically engaged in the business let us know all about it? What say you, whalemen?

Potatoes are considered one of the very best of our anti-scorbutics, but their liability to freeze in winter and grow in warm weather, renders their transportation in large quantities—such as our gallant armies require—a matter of the greatest difficulty, and taking into consideration the large crop of "sorghum molasses" which has been raised in the west this year, no better use could be made of it than the manufacturing of some 50,000 barrels of "potato wine" for the supply of our troops.

Now that I have got on the army question, let me say a few words about that infernal and villainous compound, "army vinegar," that really destroys more teeth and constitutions than the scurvy ever can.

The Government never had, nor never will succeed in having delivered, the quantities of pure cider vinegar called for by the terms of contract. There is no such article in market. It may with safety be asserted that ninety per cent of all the cider vinegar issued by our quartermasters is made with mineral acids of the most pernicious character. The only safe course that the Government can adopt for securing a supply of pure vinegar, is to erect establishments to be under their own supervision, for the manufacture of vinegar from malt. "Malt vinegar," which can be made in any quantity, being just as good as "cider vinegar," which cannot be had in large quantities at any price. It won't do to trust contractors where chemistry can be made available in substituting a cheap and villainous article for a costly but genuine one.

[The molasses in fermenting would form rum, and the starch in the potato would also be converted into alcohol. The liquor would doubtless make the sailors drunk, and the potash in the potato would, if not separated, tend to prevent scurvy.—EDS.]

BREECH-LOADING REPEATING RIFLES.

The "Rip VanWinkles" of the War Department have at last waked up to the importance of this arm of the service, and by contracting for the delivery of 35,000 Spencer rifles may in part redeem themselves. How there could be any great deliberation about arming our men with repeating rifles long before this cannot easily be explained. The testimony of soldiers from the front, who have seen the advantages of them, is almost unanimous, that no body of rebel troops can be brought into action against men known to be armed with repeating rifles.

The — Illinois were so well satisfied of the superiority of the repeating rifle, that at an expense to themselves of $40 apiece they purchased the Henry rifle, the Government giving credit for the price of the musket not issued, and agreeing to furnish suitable ammunition. Last spring the Colonel of the — Illinois Cavalry made requisitions on the War Department for horses and repeating rifles for his regiment. The rifles came, with an intimation that it was doubtful about the ability of the Government to furnish horses. He remarked that "he did not care much about horses now that he had secured 'repeating rifles,' his regiment 900 strong was equal to a brigade."

It will be found that the secret of Sheridan's success is the 10,000 cavalry armed with repeaters or breech-loaders. In the last battle the infantry on our wing, armed with muskets, were repulsed, and the rebels when attacked by the cavalry on the other wing—armed with repeaters—converted their success into a route. J. T. D.

Springfield, Ill., Nov. 1, 1864.

The Wheel Pendulum.

MESSRS. EDITORS:—Permit me in reply to the communication of your correspondent, A. S. C., in No. 19 of the present volume of your paper, to suggest that there are several causes why the vibrations of the wheels mentioned by him should not be isochronous. The first may arise from the rolling friction, which, though proportional to the weight of the wheels, is not proportional to their velocity. Hence the wheels, moving with a velocity dependent on the extent of their vibration, and varying with their position in the space through which they move, meet with a varying resistance, unfavorable to isochroniety. A second is, that it is not true that a point in any part of the wheels except their circumference describes a cycloid during their vibration. Any point within the circumference describes a curve varying from a cycloid in proportion to its nearness to the center, which vibrates in a right line. Hence the center of gravity of the wheels, which is the locus of their moving force, does not describe the isochronous curve.

A third reason may be thus assigned; the center of gravity of any wheel or cylinder at rest upon a horizontal plane will lie somewhere in a perpendicular let fall from its center of extension to the supporting plane. If the wheel be now made to oscillate, no point in such line will describe a cycloid. As shown before, no point within the circumference will describe such a curve, and supposing the center of gravity to occupy the point where the perpendicular intersects the circumference, it will describe not one cycloid, but parts of two, joining each other in an acute angle and lying with their convexity upward, conditions unfavorable to isochronous oscillation. Were it possible to convey the center of gravity to that point in the circumference which is perpendicularly over the center of the wheel when at the middle of an oscillation, it would describe a true cycloid, and the vibrations would be isochronous. In the second experiment of your correspondent, the weight of the hinge by which his wheels were fastened together probably constituted an approach to this latter condition. I do not think the angle at which the wheels were joined had any very considerable influence. If A. S. C. will place the weight that represents his pendulum at the top of his wheel, and can contrive to support it in that position, he may succeed in obtaining an isochronous movement. I would suggest, however, that he support the wheel, by magnetic attraction or otherwise, under the plane on which it rolls. A weight then placed upon the lowest point of its circumference would describe the isochronous curve. R. D.

Washington, D. C., Nov. 5, 1864.

Tool for Scaling Boilers Wanted.

MESSRS. EDITORS:—Our naval engineers stand greatly in need of a tool that will effectually and expeditiously remove the scale from the tubes of Martin's boiler, which, you are aware, is in general use throughout the service. Here is an opportunity for the exercise of the genius of the readers of the SCIENTIFIC AMERICAN.

In former years, when the duties of our naval vessels were not so exigent, scale was not allowed to accumulate on the boiler tubes to a greater thickness than $\frac{1}{8}$th or $\frac{3}{16}$ths of an inch. It was then considered very dangerous to allow it to collect to a greater extent. The tools then used were effectual. But now it is not unusual to allow scale to accumulate to the thickness of $\frac{1}{2}$, and often $\frac{5}{8}$ths of an inch, upon the tubes.

We will not question the danger of such practice; at all events it does not seem to trouble the minds of

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our naval officers, though many of our naval engineers have protested against it.

Now the usual scraping and chiseling scaling tools, formerly introduced, are no longer effectual. It is true, tubes are scaled with them, but at the cost of great labor and time, and often the boiler is disabled by injuries inflicted.

The most expeditious tool used at present consists of a double-lipped chisel, which fits the bore of the tube, and is driven down by a hammer, removing the scale sometimes in fine powder, sometimes in lumps, according to its thickness. This being the most expeditious tool, it is in general use; but it is most injurious to the boiler tubes. The heavy blow necessary to operate the tool parts the tube from the tube sheet, and often bursts them at the center. We need a boring tool to remove the scale that can be easily handled, is durable, simple in construction, and expeditious. As long as the present system of scaling is continued, the boilers of our naval steamers will be worthless. The practice of allowing scale to accumulate to such great extent is deplorable. It is unfortunate that our naval officers permit it. Scale should never be allowed to collect to a greater thickness than one-eighth of an inch, and then it can be readily removed, and much time and expense saved.

As it is not probable this article will have any influence upon the officers who command our fleet of steamers, let the inventors endeavor to supply us with a tool that will remove five-eighths of an inch scale from boiler tubes without injuring them. All tools operated by hammering are objectionable for obvious reasons. For the convenience of those who may feel inclined to attempt the desired invention I will state that the tubes of Martin's boiler are $1\frac{3}{4}$ inches internal diameter, 27 inches long, and that the distance of shell of boiler from the tube sheet is about 30 inches.

B. Edme. Chaissaing,
Chief Engineer U. S. N.

Off Charleston, S. C., Oct. 26, 1864.

Sweet's System of Screw Bolts, Etc.

Messrs. Editors:—In addition to the many suggestions already made in your paper concerning a "uniform system of screw bolts, etc.," permit me to present the accompanying tables from the trestle board of Mr. John E. Sweet, the mechanical draftsman of the very enterprising firm of Sweet, Barnes & Co., of this city.

Mr. Sweet has traveled extensively through Europe and this country, for the investigation of such subjects as belong properly to the department of mechanical engineering, and at one time was employed by an extensive firm engaged in the manufacture of bolts in Birmingham, England, to furnish plans for some of their machinery, which made him quite familiar with the English system, its advantages and defects.

There is no doubt that any system will find objectors, and that there will be some practical mechanics even who will persist in making bolts and nuts according to their own preconceived or fancied notions. But if it is desirable to have a "uniform system" why may not a plan be adopted which is a combination of the best features of those most popular with an element which is seldom mooted among theorizers on this subject, but one that will save more to the manufacturer than any other, or perhaps all the other points combined? I refer to the "relative sizes of the heads and nuts," a point to which you recently referred the Committee of the Franklin Institute as one that would probably be most difficult of adjustment.

The pitch of the threads, their angles, and the various theories of weight, strength, etc., all dwindle into insignificance when compared with that pernicious but quite "uniform system" of monkey wrenches. Their destruction in a machine shop, to say nothing of their own actual cost, cannot be surpassed by any species of the monkey tribe, and when we see, in otherwise nicely kept shops, a host of gnawed and mangled heads and useless nuts caused by them, and their careless use, I think they would be more properly termed "gorillas."

Each bolt of one size should have a nicely-fitting wrench, such as our best machinists always furnish with machines, and it is to forward such a cause that I have persuaded Mr. Sweet to let me send you his plans, which are pronounced by all "practical" mechanics who have examined them to be well worthy of adoption.

You will observe that the dimensions of all the parts are even divisions of standard rules in common use in this country, and what he terms his "standard" bolts, from a $\frac{1}{4}$ to $\frac{4}{4}$ths, vary by $\frac{1}{8}$ths; all above an inch vary by $\frac{1}{4}$ths. But when it is desired, as is often the case, to use an intermediate size, as $\frac{3}{16}$ths, $\frac{5}{16}$ths, etc., these shall be termed "bastards," and their heads and nuts shall be made the size of the head next larger or the nut next smaller. Consequently a wrench or key that will fit on a nut on the lower "standard" will fit both ends of the "bastard" and the head of the next higher "standard," thereby saving at once half the wrenches required for the Whitworth system. Observe also that if the standard sizes vary by $\frac{1}{8}$th up to $\frac{4}{4}$ths, and $\frac{1}{4}$th above an inch be adopted, the wrench that will exactly fit a standard nut will also exactly fit the head of the next larger standard, and cannot be used at all on the other sizes except the "bastards," and therefore a careless operative will be compelled to use the nicely-fitting wrench or none at all.

By a reference to the annexed table of the comparative sizes it will also be apparent that Sweet's system is a very fair compromise with all the systems in most common use in this country and England, at the same time giving the workman an opportunity of using intermediate sizes; it is also capable of being measured by rules which are at hand, and with which he is already familiar.

COMPARATIVE SIZES OF BOLTS, HEADS, AND NUTS IN ENGLAND AND AMERICA.

No. Threads to the Inch.	20	18	16	14	13	12	11	10	9	8	7½	7	6	6	5½	5	5	4½
Diameter of Bolts	¼	5/16	3/8	7/16	½	9/16	5/8	¾	7/8	1	1 1/8	1 ¼	1 3/8	1 ½	1 5/8	1 ¾	1 7/8	2
Extremes in Common Use. Minimum Nuts.	1/16	3/32	1/8	5/32	3/16	7/32	1/4	5/16	3/8	7/16	1/2	9/16	5/8	11/16	3/4	13/16	7/8	15/16
Extremes in Common Use. Maximum Nuts.	4/16	5/16	6/16	7/16	8/16	9/16	10/16	11/16	12/16	13/16	14/16	15/16	16/16	17/16	18/16	19/16	20/16	21/16
Whitworth's Standard	2/3	3/4	4/5	5/6	6/7	7/8	8/9	9/10	10/11	11/12	12/13	13/14	14/15	15/16	16/17	17/18	18/19	19/20
Seller's Scale for Nuts	1/2	5/8	3/4	7/8	1	1 1/8	1 1/4	1 3/8	1 1/2	1 5/8	1 3/4	1 7/8	2	2 1/8	2 1/4	2 3/8	2 1/2	2 5/8
Sweet's Scales. Nuts	1/2	5/8	3/4	7/8	1	1 1/8	1 1/4	1 3/8	1 1/2	1 5/8	1 3/4	1 7/8	2	2 1/8	2 1/4	2 3/8	2 1/2	2 5/8
Sweet's Scales. Heads	3/4	7/8	1	1 1/8	1 1/4	1 3/8	1 1/2	1 5/8	1 3/4	1 7/8	2	2 1/8	2 1/4	2 3/8	2 1/2	2 5/8	2 3/4	2 7/8

As to the threads, the whole numbers are used, except it may be for large sizes, the same as proposed by Messrs. Sellers, of Philadelphia; commencing with 20 to the inch for $\frac{1}{4}$-inch bolts, and so on, as per table; and may I not add that if the simplicity and convenience of such a system will not entitle it to be worthy of adoption, then may we conclude that "the day of compromises" is in fact pretty much passed.

Boyd Elliott.

Syracuse, N. Y., Nov. 7.

[We are pleased to receive Mr. Elliott's communication. Since we began the publication of the cone-pulley rules and those for pitches of screw threads, formulas for gears, etc., in this volume, we have received many letters of thanks from mechanics, expressing their satisfaction at the information. Our correspondent is too severe on the screw wrenches. For fine-polished nuts they are not desirable, but they are indispensable in machine shops, and can be made available in many places where a fixed wrench could not be used at all. The tracings referred to cannot be published.—Eds.

Preparing Furs for Market.

Messrs. Editors:—In the discussion of the Polytechnic Association, reported on page 292, current volume of Scientific American, I see it stated under the head of "Furs and their Preparation" that Dr. Parmelee said:—"The first process in dressing furs for use belongs to the hunter, who, on capturing the animal, strips off the skin and hangs it up to dry in the open air without fire. If it be well dried, and carefully packed, it reaches its destination, however distant, in good condition; but, if any moisture be left, or, if it be packed with others imperfectly dried, so that the slightest putrefaction takes place, then it is unfit for use so far as the furrier is concerned. A minute examination of the skin is, therefore, his first business. The next step is to cleanse it from greasiness. This is accomplished by the use of water, bran, alum and salt."

I have seen and dressed hundreds of thousands of furs of all kinds, both in New York and London, but I have never seen any practical workman use this process; farmers and Indians use it where they do not understand any other. I do not believe that a man can put what we call a leather on a skin with the use of salt and alum; for when it is damp weather, the fur will be soft, and in dry weather it will be hard and stiff.

The process that has been used these last thirty years, both in Germany and England, is as follows:—

When the furs come from the hunter, in the raw state, to the furriers, they are sorted over and then prepared for tanning; the term we use is "leathering." They are greased with common grease, on the leather side, and then put in a tub large enough for a man to get into and work easily at them. A cloth is then bound around the man's waist so as to keep the steam in the tub, and the skins are then worked by the feet until warm, which takes an hour or more; they are afterward taken out and greased again; when the skin and grease are worked again a few handfuls of mahogany sawdust are thrown in and worked to leather. When the skins are leathered they are taken out and pulled through a rope; they are then pickled over night in water and sawdust, and in the morning they are ready for the flesher. When fleshed they are hung up to dry, then greased again, and leathered once more; they are then taken out and the fur combed, well beaten and drawn over the knife, or "pared" as we call it. The skins are again put into the tub with plenty of fresh, clean sawdust, and worked into the sawdust until the fur is perfectly freed from grease. It may be necessary to change it two or three times. The fur is then taken out and well beaten and corned, and it is then ready for the cutter. This is the way all fine furs are dressed, from the muskrat to the Russian sable. Buffalo and bear skins are dressed in a somewhat different style, but still under the same general processes.

Charles A. Reight.

Middletown, Orange Co., N. Y., Nov. 7, 1864.

An Inventor's Experience.

Messrs. Editors:—Enclosed please find fifty dollars, expenses for the Patent Weather Strip. Accept my heartfelt thanks, also, for your valuable services in procuring me my patent; I shall always feel obliged. If I had applied to you in the first place I would have been considerably in pocket, which makes the old adages correct, that there is nothing like putting "the right man in the right place," "every man to his trade." In regard to your agency and paper I will most certainly recommend both to my friends.

S. G. Spicer.

Philadelphia, Nov. 7, 1864.

[The writer of the above after a great deal of trouble and vexatious delay, at last put his case into our hands. The result is, the patent is ordered to issue, and, like hundreds of others who have confided their business to us after having unsuccessfully tried other agencies, he has received his just deserts, and is gratified. Other persons having meritorious inventions, and who have had trouble in getting their claims allowed, owing to the incompetency of their

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agents, or for other reasons, are cordially invited to correspond with the publishers of this paper regard ing their cases.—Eds.

RECENT AMERICAN PATENTS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week; the claims may be found in the official list:—

Shoe for Mill-stones.—This invention consists in providing the shoe of the hopper of a pair of mill-stones with a screen arranged in such a manner as to effectually separate sand, cockle, and other impurities from the grain before the latter passes into or between the stones. The machines now used for cleansing grain, previous to the grinding thereof, do not perform the work thoroughly; some sand and other impurities will escape, especially if the grain be quite foul. This improvement will separate these impurities from the grain, in consequence of the latter passing through or over the shoe in small quantities just previous to entering into the eye of the stone. Henry P. Crouse, of Hartland, Michigan, is the inventor.

Improved Faucet.—This invention relates to certain improvements in the construction of cocks or faucets whereby the principles and features of a compression valve and the opening and closing motions of the ordinary plug valve are combined, and an article produced which is simple in construction, durable in wear and which can be operated more easily than any other. John Broughton, of 41 Center street, is the inventor.

Cork Hat.—This invention consists of a cork hat made of two layers of cork which are prepared with composed oil, and packed or attached to an intervening piece of canvas, muslin or other textile fabric, in such a manner that a hat is produced which is durable, elastic and impervious to water and to the rays of the sun. By preparing the cork with such oil the hardness is removed from the same, and it is rendered soft, elastic and impervious to water. Thus prepared, the cork is applicable to hats, bonnets, caps and, in fact, to head coverings of every description. The hats made according to this invention are superior for lightness, strength, durability and coolness, and it is particularly applicable to hats used in summer and in warm climates. A. C. Crondal, 706 Broadway, is the inventor of this improvement.

Machine for grinding and polishing Saws.—This invention relates to a new and improved machine for grinding and polishing hand saws, whereby the work may be done in a very expeditious and perfect manner. The invention consists in the employment or use of a horizontal wheel provided with grinders or polishers, and having its shaft fitted in a suitable framing on the top of which there are placed a series of boxes to receive the saws to be operated upon by the grinders or polishers, which, as the wheel rotates, pass over the saws and perform the work. J. H. Weaver, of Waynesville, Ohio, is the inventor.

Raising Machine.—The object of this invention is an improvement in that class of machines which are used to raise or turn up the edges of sheet metal articles, such as plates, dishes, waiters, coffee-trays, etc., and it relates particularly to a machine intended for producing the raised edges of oval or elliptical coffee-trays. The invention consists in the employment or use, in combination with the rotating raising dies, of a swinging platform which can be raised to, and retained at, any desired inclination, in such a manner that the blank can be gradually brought from a horizontal to an inclined position while its edge is exposed to the action of the raising dies, and thereby the rim is turned up and shaped according to the configuration desired. In turning between the dies the blank is guided by its edge being held in contact with two adjustable stops, which determine the hight or width of the rim to be produced. Henry Facks, of New York City, is the inventor.

Preparing Moldings.—This invention relates to an improvement in that class of machines, by means of which the preparation made of glue and chalk is spread upon the surface of wooden moldings previous to the application of the metal foil used in gilding. The invention consists in the employment or use of a box to contain the preparation, said box being provided with a steam or hot water jacket, and arranged in combination with an endless belt with carrying hooks acting upon the moldings to be prepared in such a manner that the preparation is kept at a uniform temperature, and applied at such temperature to the surface of the molding in even and uniform layers; also in the use of an endless carrying belt running over smooth pulleys or drums for the purpose of feeding the moldings along under the box containing the preparation, and under the scraper, in such a manner that the motion of the moldings is perfectly uniform and steady, and the jar consequent upon the use of cog wheels or toothed racks for feeding the moldings is avoided; finally, in the application of side flanges to the scraper, the under surface of which is tapering down from its inner edge to the scraping edge in such a manner that said scraper forms a receptacle to retain the preparation and to prevent it running over the sides of the molding. Gustave Henze, of 329 Fifth street, New York City, is the inventor.

The Way to Make Black Ink.

We publish in full the directions and remarks of Dr. Ure in relation to making this article of universal use:—

Nutgalls, sulphate of iron, and gum, are the only substances truly useful in the preparation of ordinary ink; the other things often added merely modify the shade, and considerably diminish the cost to the manufacturer upon the great scale. Many of these inks contain little gallic acid, or tannin, and are therefore of inferior quality. To make 12 gallons of ink, we may take 12 pounds of nutgalls, 5 pounds of green sulphate of iron, 5 pounds of gum senegal, and 12 gallons of water. The bruised nutgalls are to be put into a cylindrical copper, of a depth equal to its diameter, and boiled, during three hours, with three-fourths of the above quantity of water, taking care to add fresh water to replace what is lost by evaporation. The decoction is to be emptied into a tub, allowed to settle, and the clear liquor being drawn off, the lees are to be drained. Some recommend the addition of a little bullock's blood or white of egg, to remove a part of the tannin. But this abstraction tends to lessen the product, and will seldom be practised by the manufacturer intent upon a large return for his capital. The gum is to be dissolved in a small quantity of hot water, and the mucilage thus formed, being filtered, is added to the clear decoction. The sulphate of iron must likewise be separately dissolved, and well mixed with the above. The color darkens by degrees, in consequence of the peroxydizement of the iron, on exposing the ink to the action of the air. But ink affords a more durable writing when used in the pale state, because its particles are then finer, and penetrate the paper more intimately. When ink consists chiefly of tannate of peroxyde of iron, however black, it is merely superficial, and is easily erased or effaced. Therefore, whenever the liquid made by the above prescription has acquired a moderately deep tint, it should be drawn off clear into bottles, and well corked up. Some ink-makers allow it to mould a little in the casks before bottling, and suppose that it will thereby be not so liable to become mouldy in the bottles. A few bruised cloves, or other aromatic perfume, added to ink, is said to prevent the formation of mouldiness, which is produced by the ova of infusoria animalcules. I prefer digesting the galls to boiling them.

The operation may be abridged, by peroxydizing the copperas beforehand, by moderate calcination in an open vessel; but, for the reasons above assigned, ink made with such a sulphate of iron, however agreeable to the ignorant, when made to shine with gum and sugar, under the name of japan ink, is neither the most durable nor the most pleasant to write with.

From the comparatively high price of gall-nuts, sumach, logwood, and even oak bark, are too frequently substituted, to a considerable degree, in the manufacture of ink.

The ink made by the prescription given above, is much more rich and powerful than some of the inks commonly sold. To bring it to their standard, a half more water may safely be added, or even 20 gallons of tolerable ink may be made from that weight of materials, as I have ascertained. Sumach and logwood admit of only about one-half of the copperas that galls will take to bring out the maximum amount of black dye,

Chaptal gives a prescription in his *Chimie appliquee aux arts*, which, like many other things in that book, are published with very little knowledge and discrimination. He uses logwood and sulphate of copper, in addition to the galls and sulphate of iron; a pernicious combination, productive of a spurious fugitive black, and a liquor corrosive of pens. It is, in fact, a modification of the vile dye of the hatters.

Lewis, who made exact experiments on inks, assigned the proportion of 3 parts of galls to 1 of sulphate of iron, which, with average galls, will answer very well; but good galls will admit of more copperas.

Useful Application of "Slag."

It is with satisfaction that we are able to direct attention to the invention of an improved mode of applying blast-furnace slag to building purposes, which has lately been devised by Mr. Parry, of the Ebbw Vale Ironworks, the more so since this method appears to strike at the root of the difficulties which have hitherto been insuperable obstacles to the application of blast-furnace slag. By applying a blast of air, or a jet of steam, to the slag as it runs from the smelting-furnace in a melted state, it is suddenly cooled, and reduced to a state of extreme subdivision, so as to be easily reducible to powder, an operation that would be entirely out of the question for any purpose with the slag in its usual stony condition. By this ingenious device, the slag is converted into a material eminently suitable for the purposes of brick-making, and for the manufacture of artificial stone, and it is also proposed to use it as a manure. To any one who has visited iron-smelting works, and seen the enormous mountains of slag, or, as it is technically termed, "cinder," growing around them, and covering land which would else be available for other purposes, the importance of any means of rendering this material useful will be apparent. Those who have not had this opportunity of judging will readily understand the importance of the subject, on considering that for every tun of pig-iron made, some three or four tuns of slag are produced, and that the present make of pig-iron in this country amounts to the enormous quantity of four and a half million tuns a year.

The advantage of turning this waste slag to account would be almost incalculable, for not only would the profit of the iron-master be increased, but the cost of iron might be reduced, if Mr. Parry's method of using the slag should result in that success which there is every reason to anticipate it will meet with. Another point which is deserving of notice in regard to this application is that it is one which in its magnitude bears some proportion to that of the production of the material sought to be used. The rapid progress of building and of engineering operations is such as to offer a promising future to any good plan of providing materials for construction from other sources than those hitherto available, and probably of better quality than have hitherto been obtainable. The manufacture of bricks is one of those arts which has remained, probably, more stationary than is the case with most branches of industry, and the activity which has of late years been manifested in the attempts to produce artificial stone or building blocks shows that there is a want of something more, and, if possible, better than the old-fashioned clay brick, which has, in its time, done good service, and is, therefore, not to be despised, but which, in common with all other things, is liable to be superseded in the ordinary progress of improvement, and in consequence of the development of new requirements and new resources. We sincerely hope that this interesting invention of Mr. Parry's may prove to be all that he can hope and all that can be desired, both in advantage to himself and to the community generally.—*London Mining Journal.*

Preserved Fruit.—We are indebted to the Oneida Community, Oneida, N. Y., for some choice specimens of their preserved fruits. They are nicely put up in glass jars, and not only attract the eye but delight the taste. We recommend our friends who wish to purchase a good article in this line to call on M. L. Bloom, Agent of the Community, No. 40 Reade street, New York.

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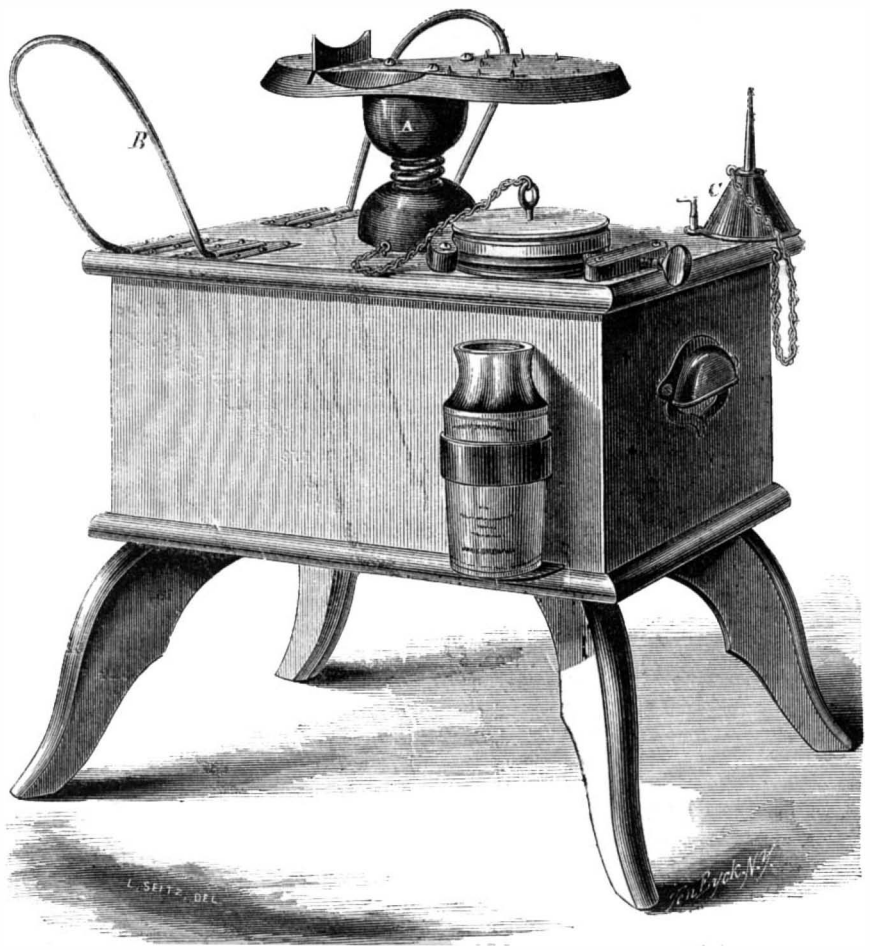
Improved Boot-blacking Case.

No doubt many of our readers who polish their own boots and shoes have found it exceedingly inconvenient to have their brushes and blacking lying about in one place and another, wherever careless housemaids choose to throw them. There are often busy little fingers, too, prone to do things which they should not, ready and eager to investigate the contents of the blacking boxes, and to eat the paste for the sake of the sweetish taste the molasses imparts to it. It is also annoying to hunt about for a box, or some place to put the foot on while the boot is polished. All these vexations will hereafter be avoided wherever the apparatus illustrated in the accompanying engraving is used. It will be seen that a neat box is provided, with a pedestal, A, on which the foot is set. This pedestal has a spring base, so that the foot can be inclined at any angle, and all parts become accessible to the brush. The blacking is always held firmly in one place, and the brushes are to be put inside the case; the lid lifts for that purpose. The bottle at the side contains liquid blacking, so that all the necessary fixtures have their several places. The wire handles, B, at one end of the case, afford a convenient brace to hold by while polishing. The can, C, is to contain water for the paste blacking. This is a very useful contrivance, and one which should be introduced into every well-regulated house. To persons living in hotels or boarding-houses, as well as housekeepers, it will be found equally advantageous.

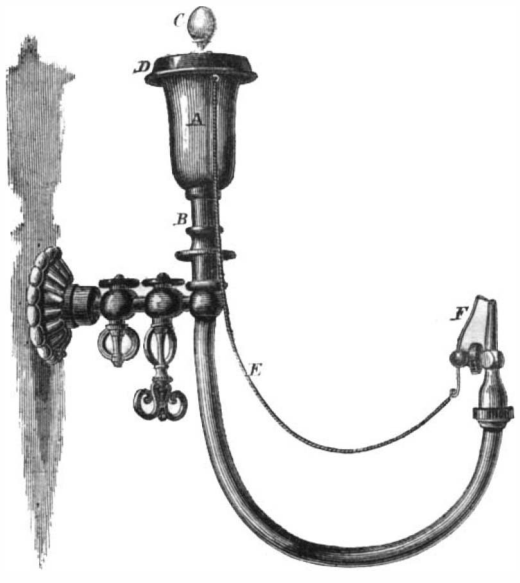


PORTER'S BOOT-BLACKING CASE.

Patented through the Scientific American Patent Agency, on the 13th of October, 1864, by J. H. Porter, No. 415 Hudson street, New York. For the apparatus or purchase of rights address as above.

CORNELIUS AND BAKER'S ELECTRIC BRACKET.

The idea of lighting gas by electricity is not new. In former years many plans were tried to effect the the object, but they all lacked the simplicity required to make them practicable. When the Cooper Institute was dedicated it was intended to light every burner instantaneously by electricity at a certain point in Mr. Cooper's (the founder) address. The time came, but the light did not; and the orator, after pausing for a light in vain, omitted that part of the ceremony. This bracket, or apparatus, is liable to no such derangement, for the electric current is generated by friction, and is certain to work. We have one in our office, and have tried it at all times and found it infallible. It will be generally understood by the following description:—The brass cup, A, sets on the hard rubber insulator, B, and has a fur lining, which is afterward covered with silk. The knob, C, is the handle to a hard rubber cap, D, which fits the cup so snugly that a slight pressure is needed to force it down to the bottom. By the friction of the cap with the fur and silk lining, the cup is charged, and the conductor, E, carries the spark to the wire, F. This wire is of platinum, and is set at a definite point from the burner. By merely lifting the cap, D, the gas jet is ignited. The operation is as beautiful as the effect is instantaneous, and the use of matches is entirely obviated. For use in parlors, sleeping rooms and, in fact, all places, this bracket is an exceedingly convenient thing, and produces a great saving of matches. One can be seen in operation at this office. Patented by Robert Cornelius, in October, 1864. Manufactured by Cornelius & Baker, manufacturers of gas fixtures and chandeliers, 710 Chesnut street, Philadelphia.



Converting Iron into Steel.

At the Academy of Science, M. Caron sent in a paper on Cementation, in which, contradicting the views entertained by M. Margueritte, who supposes pure carbon to be alone sufficient to convert iron into steel, he remarks that the operation on a large scale consists in enclosing iron bars in a large box of the same metal, together with charcoal made of green wood. When the mass has got to a red heat, the oxygen of the air contained in the box forms an oxide of carbon by its contact with the charcoal; on the other hand, the nitrogen of the same air forms cyanides with the alkaline metals contained in the charcoal, so that the iron to be cemented is in contact with three principal elements—carbon, oxide of carbon, and the cyanides alluded to, all of which elements are necessary to cementation.

Blockade Running.—The captain of a vessel direct from Glasgow, Scotland, says there are hundreds of steamers building and fitting out in the Clyde and adjacent waters, all to run the blockade. They act as if the war was to last for the next five years. He says every shipbuilder on the Clyde has gas-lights in his yards, and, with relays of hands, works every hour of the twenty-four.

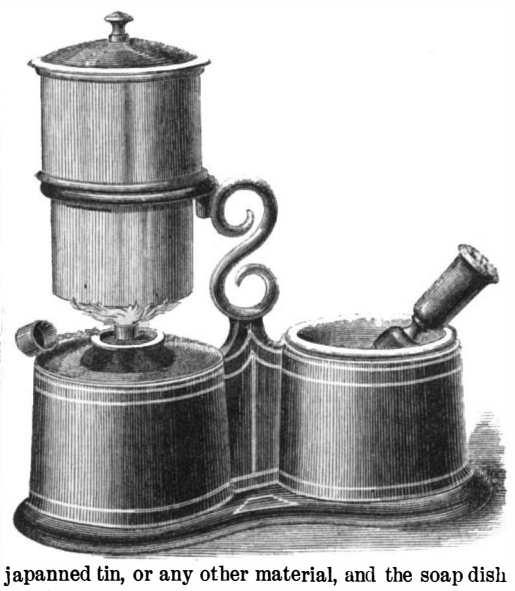
The Way to Prepare Tripe.

At the last meeting of the Farmers' Club, Solon Robinson, in reply to an inquiry by a correspondent, gave the following clear directions for preparing tripe:—

"Cut as small an opening into the paunch as possible through which to empty the contents. Do this with care, so as not to smear the outside, and carefully wash off any substance that may adhere. Then let one man thrust his arm into the opening and seize the bottom firmly, while another turns the sac inside out. Now sow up the slit that was cut, firmly, with strong twine. The sac is now to be thoroughly washed in cold water, and then either covered with whitewash just as you would cover a sheepskin to loosen the wool, or else placed in a tub of strong alkali made of lime, or wood ashes or potash, and kept there until the wooly coating is loosened so that it can easily be scraped off with a knife. As soon as this is the case, give the sac another thorough washing to cleanse it of the lime, and then it is ready to be cut up for scraping. Cut it in long strips, about five or six inches wide; lay one of these upon a table or board before you, fastened at one end with a couple of tacks, and scrape with a dull knife until quite free of the adhering coat. Then wash and put the tripe to soak in weak brine for twenty-four hours or longer. Then wash again and it is ready for boiling. It should be boiled until it is quite tender, when it may be pickled or put away to be eaten fresh after re-cooking by stewing, frying or broiling; and there certainly is no part of a beef that affords richer or more palatable food; it is through the sin of ignorance that it is so often wasted."

BOURNE'S HEATING AND SHAVING APPARATUS.

This engraving represents an extremely convenient apparatus for heating water for shaving, or other domestic purposes. Both the spirit lamp and the soap dish are contained in an ornamental cast-iron stand which is bronzed, or ornamented in any desired style. The lamp and water vessel are made of



japanned tin, or any other material, and the soap dish can be removed for cleansing, when necessary. To boarders and others it will be a great convenience.

Rights for the sale of this apparatus and all further information can be had by addressing Charles S. Bourne, Springfield, Mass., by whom it was patented through the Scientific American Patent Agency, on Sept. 13, 1864; or Wm. E. Udell, Albany, N. Y.

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NEW YORK, SATURDAY, NOVEMBER 19, 1864.

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EXTENSION OF PATENTS—FOR WHOSE BENEFIT THEY ARE GRANTED.

There seems to be an impression among inventors that since the law of March 4, 1861, went into force, the previous law, in respect to extending patents for seven years, was abrogated. This is not so in regard to cases which were patented under the old law. Any patent which was granted prior to March 4, 1861, may be extended for seven years on proper application to the Patent Office, provided the patentee has not already been amply remunerated for his invention, and proves to the satisfaction of the Commissioner that he has used proper diligence in attempting to realize gains from his patent. The patentees of 1851 should lose no time in making out a statement of their profits and losses in consequence of their patents, and in seeing counsel in regard to an extension, if they wish the term of these expiring patents continued for another seven years.

It is often the case that the extended term of a patent produces to the patentee a ten-fold profit over the amount realized during the first fourteen years of its existence. The assignees of a patent cannot obtain this extension: it must be done at the instance of the inventor—or, if deceased, his heirs may apply for the extension, but in either case ninety days' notice of their intention should be given—for whose sole benefit it is granted.

For full particulars concerning extension, address

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37 Park Row, New York.

THE CITIZEN'S GREAT DUTY.

ABRAHAM LINCOLN, of Illinois, has been re-elected President of the United States by a large popular majority; and ANDREW JOHNSON, of Tennessee, has been chosen Vice President, to succeed Hannibal Hamlin, of Maine. The election passed off peaceably and without the necessity of military interference; and it now becomes citizens of all parties to yield a willing and cheerful obedience to the authorities thus constituted by the popular suffrages. Under our constitutional Government such obedience is absolutely requisite to the permanent safety and prosperity of the Republic; for unless this Government be upheld by the united strength of the people its destruction will ensue; order will give place to anarchy, and anarchy will be succeeded by a despotic power supported by military force and violence.

We have already witnessed the direful consequences of a rebellion against the rightfully-chosen leaders of the nation, the sad effects of which will exist for a generation at least. We therefore exhort our readers to put aside all partisan bitterness and yield unwavering devotion to the Government. This war would, in our judgment, come to a speedy end if citizens of every class would unite in strong determination to succeed. We have a country and a government worth saving, and it cannot be rescued from destruction by sharp partisan conflicts, such as we have now most happily passed through. We could find fault with the Administration—it has committed grievous errors; but we are forced to believe that the Chief Magistrate has endeavored to do his duty manfully and faithfully, and it is no fault of his if he has not the mental power of a Burke or a Webster. Let statesmen now forget their political aspirations and apply their wisdom to great questions affecting our civil government; let financiers busy their brains with such schemes as will best support the national exchequer. Soldiers will then stand by their arms, and, with the moral power of the nation to sustain them, will battle with and defeat the enemy; ministers will preach "of righteousness, temperance and a judgment to come," not forgetting that "without charity we are nothing;" farmers will toil at the plow and in the harvest field; mechanics will be busy in the workshop and the manufactory, while the inventor with his keen perception of the great necessities of the Government and the people for labor-saving machinery, will tax his fertile brain to meet these necessities; and, altogether, we will join hearts and hands in lending our moral and financial support to the Government, believing that thus, and thus only, can we save the goodly heritage of our fathers.

IS GUNPOWDER LIABLE TO SPONTANEOUS COMBUSTION?

The recent terrible explosion near London has led some of the ablest of the English journals to suggest the liability of gunpowder to spontaneous combustion, and the location of large magazines in the vicinity of some of our cities makes this suggestion of great interest to us.

There are four processes by which substances are set on fire spontaneously:—1st, by the rapid absorption of oxygen from the atmosphere; 2d, by fermentation; 3d, by the development of heat in the change from the solid to the liquid state; 4th, by the condensation of gases on the surface of solids.

1st. There is a class of oils called drying oils, from the fact that when exposed to the atmosphere the oxygen of the air enters into chemical combination with them, and converts them from liquid oils to solid resins. This property adapts these oils to use as paint. When oils of this class are spread out in a way to offer a very large surface to the action of the atmosphere, the combination of oxygen with them is sometimes so rapid as to set them on fire. The largest surface of oil in proportion to the mass can be obtained by spreading it over the minute fibers of cotton, linen, or wool, and the great majority of cases of spontaneous combustion have resulted from saturating some of these fibers, either in the mass or in cloth, with linseed oil.

2d. When damp straw or manure takes fire from fermentation, the heat results in this case also from the absorption of oxygen from the atmosphere.

3d. When water is brought in contact with quick lime the two substances enter into chemical combination with each other, forming hydrate of lime. The water is changed from the liquid to the solid state, and its heat of fluidity is converted from latent to sensible heat. When the change is sufficiently rapid the heat given up will set fire to any dry wood with which the lime is in contact. Much property has been destroyed by this process of spontaneous combustion.

4th. Charcoal, in common with some other substances, has the property of attracting gases to its surface with such force that the gases are condensed, and the condensation of course develops heat. In some cases this condensation is sufficiently rapid to set the charcoal on fire.

If gunpowder ever takes fire spontaneously, it must be by the process last described; but this is in he highest degree improbable. It is only freshly burned charcoal that has the property of condensing gases on its surface; by being wet it loses the property. As the several ingredients of gunpowder are mixed together in the form of a moist paste, the susceptibility of the charcoal in it to spontaneous combustion must be destroyed. We have never known an instance of gunpowder taking fire spontaneously and we expect never to know of one.

THE AVERY ENGINE.

We have had many inquiries in relation to this engine, and we will undertake to answer them all in one article. The Avery engine is simply Hero's engine with sword-shaped arms. Hero lived at Alexandria, in Egypt, 120 years before the Christian era, and among his numerous inventions was the first steam engine ever constructed. It was formed by connecting a tube with a steam pipe in such manner that it could revolve, and having a second tube crossing the first at right angles, with the interiors in open communication. Small holes were then made in the second tube near its ends and on opposite sides. As the pressure of the steam against the interior walls of the tubes was exerted on all parts except the holes, the pressure opposite to these holes caused the apparatus to revolve. Two thousand years afterwards an Englishman by the name of Barker attached his name to Hero's engine, and it is now generally known among the English as Barker's mill.

In order to obtain the full power of the steam from Hero's engine it is necessary that the parts where the steam escapes should move with a velocity equal to that with which the steam issues from the orifices. This high velocity causes great resistance from the air, and to diminish this resistance Mr. Avery conceived the idea of making the cross tube or arms sword-shaped. He obtained a patent for this improvement, and Hero's engine with sword-shaped arms is known in this community as the Avery engine.

Thirty years ago there was a large saw mill in Attorney street, in this city, driven by an Avery engine. The arms extended about five feet, and the engine was run about 3,000 revolutions per minute, making the velocity at the ends of the arms about equal to that of a cannon ball. As the specific gravity of steam at the atmospheric pressure is less than that of air, the resistance would be less if the engine were run in steam than if it were run in air; it was accordingly surrounded by a box with a small opening for the escape of the steam but which confined it sufficiently to exclude the air. The openings in the arms were very minute, if we remember rightly only one sixty-fourth of an inch area, and the steam was worked at a very high pressure.

In order to resist the great centrifugal force resulting from such rapid rotation the arms were made of cast steel. On one occasion a new engine was started which proved to have a flaw near the end of one of the arms; the piece came off and went up through two or three floors with a force equal to that of a cannon shot.

By long use deep furrows were worn in the edge and sides of the revolving arms, giving a jagged edge like an irregular saw. These furrows were probably first started by particles of dust, and the wearing was continued by the friction of the steam.

After this engine had been in use some twenty years it was taken out, and a cylinder engine was substituted. We have been told that the proprietors regretted the change after it was made, finding on trial that they did not like the cylinder engine as well as the old revolver.

A locomotive was constructed in this State with an Avery engine, but did not prove a success. The high velocity with which the arms revolve causes great resistance to any change, however slight, in the plane of rotation, and this unfits the Avery engine for locomotive purposes either on railways or steamboats. Every passage of a curve on the railroad, and every roll of a steamboat would change the plane in which the arms were revolving, and the resistance offered by the high velocity to this change of plane would rack the supports of the engine to pieces.

PETROLEUM.

Like all other great staples of the country this oleaginous one requires machinery to aid in bringing it to the surface and to market. Its cost of production

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can thus be very much lessened, and the profits of well owners, brokers, and all concerned, correspondingly increased. Pumps are wanted, boring tools and engines are required, besides a host of minor auxiliaries not necessary to specify. Let oil men make their wants known in this particular and they can be supplied with any machine required. Ingenious men connected with operations of the character in question should keep their eyes open. Fortunes have been pumped up out of the ground in a week, out there are a good many above ground still, and those who shall seek shall find.

CONCERNING VALVES.

When a feed pump becomes deranged the first thing the engineer thinks of examining is the valve seats. They are so universally a cause of trouble that the ingenuity of inventors has been exhausted to facilitate the inspection of these parts. Bolts are made ready to cast off at a moment's notice, and bonnets are so contrived that they may be quickly disengaged. The trouble with valve seats frequently arises from imperfect construction. Valves are of so many different kinds, however, that some discussion of the several varieties may not be out of place. The ordinary circular brass valve with a brass seat, sometimes called a clack valve, is one generally used in small pumps for feeding boilers, and other uses. They are sometimes made with flat seats, but are oftener conical in form, and when thus made are frequently defective from bad proportion. The taper is made too slight, so that in rising and falling the valve becomes jammed in its seat, and refuses to work. Valves with spindles often leak from the spindle being bent; a very slight bend, not visible except by putting the valve in the lathe, is enough to disable the pump. Muddy water is also a source of trouble in this respect. These valves work very well in pumps where not over four or five inches in diameter, but beyond that size a better substitute is found in a vulcanized india-rubber disk. The disk in use varies from half an inch in thickness to two and a half inches, according to the area of the passage; and the seat is simply a grating, with the sharp edges rounded so that the valve will not be cut by them. In spite of this precaution, however, the valves wear rapidly when large, by reason of the heavy pressure from above. This objection has been measurably overcome by employing a number of small valves instead of a single large one. This plan, again, has the disadvantage of necessitating small bolts and narrow openings in large pumps and heavy buckets, so that the small fixtures are often knocked off and broken by the violence of the water in meeting, or passing through them. These small valves and openings also churn the water into foam, so that the pump is much less effective than when lifting a solid column.

Of old the ponderous metallic butterfly valves were used in marine steam engines for foot valves, outboard delivery valves, and the valves at the nozzle of the air pump, where it delivers its contents to the hot well. These valves weighed upward of 200 pounds each, on heavy engines, and the thumping and pounding when they were at work may be imagined. It was a great improvement when they were deposed by rubber valves, as they now are universally. Force pumps on screw engines and locomotives have usually much larger valves and openings than common pumps, and in marine engines they are invariably of vulcanized rubber. Ball valves were formerly much used, but are not now in modern steam engines. The objection to valves of this form is that they fill the water ways above, unless a side passage be made for the water in the valve chamber. When made of rubber it answers well in small pumps. Metallic balls are used, but they are costly to make, and are not always tight; they are also heavy, and batter the seats.

Much ingenuity has been expended in making valves in complicated forms, but such methods are, in our opinion, wrong. Simplicity of construction in a steam engine is the first requisite, for from it generally arises other good qualities. The puppet valves of marine engines were first made of cast-iron, and were single disks. Intelligent engineers, however, prefer to use double beat, or balanced valves instead, not only on account of the reduced labor in handling the engine, but also from the decreased wear and tear of the parts which operate them. Mere force can as well be applied to a single disk valve as to raise an anchor, but it requires no judgment to apply it, and is a simple question of areas. Instead of being iron they are now brass and iron, in such proportions that the greater expansion of the softer metal is compensated for by its reduced quantity. When this proportion is observed the valves are perfectly tight, and will remain so with proper care.

GREASE BALLS.

Mr. Gilbert Valentine, engineer at Messrs. Harper & Bros., in this city, recently called at this office with some balls of grease which had collected in the exhaust pipe of his engine to such a degree that the opening was practically closed. These balls were sixteen in number, and we are informed that there were six more. They are about an inch and three-quarters in diameter, in appearance black, and of the nature of black-lead in consistency and fracture. They cut easily and leave a shining mark under the knife. Mr. Gilbert informs us that he uses nothing but tallow in his cylinder. The formation of such balls is not unusual in steam engines, and we have seen them taken from locomotive cylinders and other engines in localities where hard water was used. They are principally composed of tallow, which combines with the impurities in the water carried over by the steam, together with such foreign matter as may accidentally be introduced to the cylinder. The wear of the surfaces in contact, such as the packing and the cylinder, is also carried off by the grease, so that a portion of iron is contained in them. These balls often accumulate in the bottom of the cylinder ports, and, where the clearance is great behind the piston, or before it, have been known to knock out the head by being blown out of the port into the cylinder. Balls formed in engines operating in limestone regions, or where the water is unusually calcareous, are frequently as hard as stone. Those which Mr. Valentine brought us are the largest we have ever seen.

Some engineers use black-lead in cylinders that have been badly scratched, and the presence of this mineral is exceedingly favorable to the formation of grease balls. The existence of them shows the necessity of frequent examination of all parts of steam engines, especially the pistons and ports, or those points where such accumulations are likely to occur. The passage of the exhaust pipe alluded to was almost stopped by the presence of eighteen solid balls nearly two inches across.

EXPANSION OF LIQUIDS.

In a former article we treated of the degrees of expansion of certain metals and other solids. Gases and liquids expand also, but in different ratios. The same liquid, water for instance, expands unequally at different temperatures; but the law for its changes as well as for those of other liquids cannot be laid down with certainty. As a general rule, however, the fluids which expand the most are those which boil at a low temperature, as alcohol and some of the more volatile essences. The amount of force generated in the expansion of liquids is enormous, and this is taken advantage of by practical men in testing steam boilers with little or no labor, and with great certainty and safety. The plan is to fill the boiler as full of water as it will hold, close all apertures, and load the safety valve to the greatest amount the boiler will ordinarily bear. A fire is then kindled in the furnaces, as usual, and the heat causes the liquid to expand, long before it reaches its boiling point, with great force. Water expands very irregularly, with equal increments of temperature, between the freezing and boiling points; the whole amount of its expansion between the two degrees just mentioned is comparatively small, its coefficient of expansion being less than that of any other liquid, except mercury. The most noticeable irregularities in the expansion of water occur between 32° and 40°, and, what is most singular, while all other fluids have the greatest density at their freezing points, that of water is shown at 39°.2 Fah., and either above or below this point it expands. This fact is fully proved by experiments made with apparatus devised for the purpose, and it explains why but a comparatively thin coating of ice, compared to the body of water, is formed on the surface of rivers and lakes, even in winters of great severity; for although water freezes at 32°, before that temperature can be reached the water on the surface expands, and although colder is specifically lighter than the warmer and larger bulk below on which it floats. Ice is then formed on the surface; and, being a bad conductor, prevents the water below from freezing to a great thickness by checking radiation.

FINED FOR NOT WORKING.

It seems that the race of Gradgrinds, that Charles Dickens speaks of in "Hard Times," is not yet extinct in England. An apprentice to an iron-founder in England, who lately plead guilty of having absented himself for one day from his work, was sentenced to one month's imprisonment, at hard labor.

That must have been a cheerful service which the youth rendered after this punishment. Employers are often foolish. Compulsion is no part of a youth's instruction in a trade; if he do not take to it cheerfully and naturally he is useless, and might better be out of the shop than in it. Apprentices are no longer bound in this country, and this reform has instituted itself. The character of our apprentices is too high to admit of even seeming vassalage, and when master and apprentice cannot agree it is time, for the self-respect of both, that they should part.

There is something to be said for both sides. Boys will be boys, and to expect a youth to come into a shop and lay aside forever all his youthfulness and become the sober journeyman is unnatural. A boy without spirit is no boy at all, and he must have recreation at proper times and seasons.

Eye service is useless. A boy that works while his foreman is present, and goes into ground and lofty tumbling when he is absent, is better out of the shop, for he wastes his own time and sets a bad example to others. Out of the shop the employer has nothing to do with him, and his time is his own; his morality and his accountability for misdeeds are also his own; he alone must answer for them.

If a youth wishes to learn a trade he will apply himself; it is his interest to do so; and if his master is wise he will encourage, but never enforce, attention. Keep boys apart. Recruits in the army are put with veterans, and soon make good soldiers. Fun is contagious, and one joker will infect a dozen steady fellows. Boys have their places in the shop as well as in the world, and they make journeymen as well as members of society. It is no part of the law of good sense or kindness to misuse them or be hard upon them.

BEWARE OF RAW PORK.

A few days since we observed a butcher tasting some raw sausage meat in his shop, and the act was immediately associated in our mind with a singular-looking bottle which Dr. Hallett, of Brooklyn, has standing on the table in his office. When we first saw this bottle we supposed that it contained strips of some white bark very nicely prepared. But Dr. Hallett informed us that it was a tape worm, which he had recently taken from the bowels of a man who contracted it by eating raw pork in California.

The old readers of the Scientific American will remember that the origin of tape worms in raw pork was pointed out in the pamphlet of Dr. Weinland, which was noticed on page 100, Vol. V., new series. As we have several thousand new readers we repeat the caution. Fortunately the tape worm is very rare, but when it does occur it is caused by eating raw pork.

BLOWING UP OF THE "ALBEMARLE."

The rebel ram *Albemarle* was destroyed on the 28th ult., by a torpedo, which was placed in position by a method that has been frequently recommended in the Scientific American. This method is to attach the torpedo to a boom extending forward from the bow of a swift vessel. It was demonstrated by Fulton that any vessel could be destroyed by the explosion of 100 lbs. of gunpowder in contact with her bottom. The difficulty has been to get the torpedo against the vessel's bottom and explode it there. Plans for floating torpedos down by the tide very rarely if ever succeed, and even when they are placed on the bottom vessels usually pass over them with impunity. But when a brave officer has a torpedo

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on a boom projecting from the bow of his own vessel he can place it under the bottom of any hostile craft, provided his own vessel is swift enough, and is not destroyed before he can get in proper position.

The apparatus for handling the torpedo by which the *Albemarle* was destroyed was designed by Chief Engineer, Wm. W. Wood, of the navy. It was rigged on the bow of a small steam launch, and seems to have been so arranged that the torpedo could be lowered into the water when the hostile craft was approached.

The *Albemarle* was an enormous iron-clad ram, said to be far more powerful than the *Merrimac* or the *Tennessee*. She was lying in the Roanoke river, at Plymouth, surrounded by a crib of logs arranged to protect her from rams and torpedos.

The desperate enterprise of attempting the destruction of this great ship of war with a launch and 13 men was undertaken by Lieut. W. B. Cushing, of the navy. Selecting a dark, stormy night he proceeded silently up the river between the enemy's pickets, and driving the bow of his vessel among the logs that surrounded the *Albemarle*, he lowered the boom and by a vigorous effort pushed the torpedo under the overhang of the ram and exploded it. At the same instant a shot from the enemy on shore crushed through his little boat and demolished her. Calling to his men to save themselves, he jumped overboard and swam ashore. After hiding in the swamp through the day, he fortunately suceeeded in finding a skiff, and reached our fleet at 11 o'clock the following night.

Never before in the history of warfare has there been a naval battle at such odds as this. The *Albemarle* is the second great rebel ram that has been disabled by a single shot.

ISSUED FROM THE UNITED STATES PATENT-OFFICE

FOR THE WEEK ENDING NOVEMBER 8, 1864.

Reported Officially for the Scientific American.

☞ Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

44,924.—Gang Plow.—S. H. Adams, Coulterville, Ill.:

I claim, first, Pivoting the forward ends of the plow beams, E E, to a slotted lever, D, and supporting the rear portions of said beams upon a slotted lever, D′, both levers, D and D′, being capable of receiving a lateral or endwise adjustment, substantially as and for the purposes described.

Second, The combination of the intermediate beam, G, lever, D, and hinged plow beams, E E, with the adjusting lever, J, substantially as described.

Third, The laterally and vertically adjustable levers, D D′, pivoted to the supporting frame, A B, and adapted to form a forward pivot connection and a rear support for the plow beams, substantially as described.

Fourth, The vertical guides, e e, applied to the laterally adjustable lever, D′, in combination with the pivoted plow beams, E E, and lever, D, substantially as described.

44,925.—Spring.—Henry A. Alden, Matteawan, N. Y.:

I claim, first, The employment of concavo-convex plates fitted in pairs upon a spindle or axle, in such manner as that the convex and concave surfaces shall be opposite, in combination with perforated vulcanized india-rubber disks mounted upon said spindle, when interposed between the said plates and enclosed within their concavities, substantially as set forth.

Second, In combination with concavo-convex plates fitted upon a spindle, as described, I claim indenting the plates along their circumference in such manner as to increase their elasticity to compression from the center towards the circumference, substantially as set forth.

Third, In combination with concavo-convex plates fitted upon a spindle and indented along their circumferences as described, I claim the use of vulcanized india-rubber disks interposed between said plates, in the manner and for the purpose set forth.

Fourth, In combination with concavo-convex plates indented along their circumferences and fitted upon a central spindle, I claim the mode herein described, or its substantial equivalent, of locking the plates constituting a pair, in the manner and for the purpose set forth.

44,926.—Instrument for making Cigarettos.—Louis L. Arnold and Francis X. Hazman, New York City:

We claim, first, The machine for making cigarettes, substantially as herein described, the same consisting of a suitable hinged frame containing rollers, in combination with an endless band when the same is coated with vulcanized india-rubber so as to impart rolling friction with yielding pressure, substantially in the manner and for the purposes set forth.

Second, In combination with an endless band and two rollers hung in a hinged frame, as described, we claim making the said frame of a skeleton form, substantially in the manner and for the purposes set forth.

Third, We claim the combination of rollers, vulcanized india-rubber band, and skeleton frame, the whole being constructed and arranged for operation substantially in the manner herein set forth.

44,927.—Buckle.—Isaac Bannister, Newark, N. J.:

I claim the holding-bar, a, or its equivalent, when placed in the position, and for the purpose specified.

44,928.—Mode of uniting Metallic Surfaces.—Wm. B. Barnard, Waterbury, Conn.:

When a metallic rivet, screw, or screw socket is covered or partially covered by an envelope or coating of india-rubber, paint, or other suitable insulating material, I claim combining such insulated rivet, screw, or screw socket, with a metallic plate, by inserting it in a simple cavity in said plate, and then securing it therein by means of the punch, A, formed and employed as herein set forth.

44,929.—Machine for nailing Boxes.—C. Baur and W. C. Munder, Newark, N. J.:

We claim, first, The employment or use of a rotating nail-carrier in combination with a reciprocating nail-driver and suitable table supporting the boards or boxes to be nailed, substantially in the manner and for the purpose specified.

Second, Making the nail-driver, with a shoulder, k, substantially as and for the purpose set forth.

Third, Depressing the belt, E, by the automatic action of the machine, substantially as and for the purpose described.

Fourth, The automatic feed mechanism in combination with the nail-carrier and nail-driver, constructed and operating in the manner and for the purpose substantially as herein specified.

44,930.—Apparatus for compressing Air Gas, etc.—Salmon Bidwell, Philadelphia, Pa.:

I claim a series of barrels of different diameters provided with pistons and valves, and arranged and operating in union with each other, substantially as herein described, so that the elastic fluid compressed in the larger barrels shall pass directly into the smaller barrels, to be there further compressed, as set forth for the purpose specified.

44,931.—Hydraulic Indicator.—Robert D. Bradley, Preston, Md.:

I claim, first, The float, B, slide, B′, arm, C, and lever, D, employed in connection with the indicator, E, substantially as and for the purpose set forth.

Second, The employment of a spring, F′, and wheel, F, operating in connection with the float, B′, to turn the cam, G′, and operate an alarm apparatus, in the manner explained.

Third, The cross heads, M, and wires, I I′, employed in combination with a float and indicator, as and for the purpose set forth.

[This invention is of great value to persons interested as to the light of water in streams, etc. It consists essentially in the employment of the alarm mechanism of a clock in connection with a float.]

44,932.—Take-up of Circular Knitting Machines.—Henry Brockway, Cohoes, N. Y.:

I claim, first, The combination with the stationary cam, B, and take-up roll, D, of the levers, E and j, pawl, k, ratchet wheel, l, gears, g f, shaft, d, endless screw, c, and worm wheel, b, the whole applied and operating, substantially as herein specified, to produce the movement of the said roll, substantially as herein specified.

Second, The shaft, y, with its arm, y2, and crank, 5, the link, 6, or its equivalent, and the lever, x, applied in combination with each other and with the frame, H, ratchet wheel, l, pawl lever, j, and cam lever, F, substantially as and for the purpose herein set forth.

44,933.—Faucet.—John Broughton, New York City:

I claim, first, The arrangement of the rotating disk valve, F, working in the interior of the supply chamber in combination with the elastic seat, n, spindle, H, and handle, substantially as described.

Second, The employment of the spring, O, to keep the valve in contact with its elastic seat, independent of the pressure of the fluid when arranged in conjunction with the spindle, H, the discharge chamber, B, and the handle, J, substantially as described.

44,934.—Fire Escape.—Richard Chandler, New York City:

I claim the arrangement and combination of the devices, A C E F and H, when arranged, combined, and operated as herein described, and for the purposes set forth.

44,935.—Mowing Machine.—Alzirus Brown, L. G. Kniffen, and Thomas H. Dodge. Worcester, Mass.:

We claim in combination with the ratchet quadrant sheave, T, the self-acting pawl, l, when applied, constructed, and operated substantially as and for the purposes described.

44,936.—Trunk.—E. S. Clapp, Montague, Mass.:

I claim, first, The combination of a trunk, or its equivalent, with wheels for transporting it, so arranged as to be concealed within its outside walls when at rest, substantially as described.

Second, I also claim constructing trunks for transporting baggage and other goods, with cavities to conceal wheels and their necessary connections, which can be projected from and returned within their cavities by means of one of the handles of the trunk, substantially as above described.

[This invention consists in so constructing an ordinary trunk as to make it capable of being transported upon self-contained wheels, which are concealed when the trunk is at rest, and projected from its sides when it is about to be moved, so that it may be wheeled after the manner of a cart to the desired point, thereby saving the labor of lifting it and the expense of porterage.]

44,937.—Unloading Grain from Cars.—Eliphalet M. Clark, Detroit, Mich.:

I claim, first, A shovel or scraper, N, attached by a cord or its equivalent to a drum, B, rotated by any suitable power and adapted to be automatically thrown out of gear as the shovel approaches the end of its stroke, substantially as herein described.

Second, I claim the hinged or swinging frame, L, employed in combination with the shovel, N, and drum, B, substantially as and for the purposes set forth.

Third, I claim the automatic clutch movement, C D F G H, operating in combination with the aforesaid shovel, N, drum, B, and cord, T, substantially as specified.

44,938.—Composition for Pavements, Roofing, etc.—Joseph Clarke, Syracuse, N. Y.:

I claim the manner herein described of making and laying composition pavements, roofs, and floors.

44,939.—Spring-brim Hat.—Smith Collins, New Haven, Conn.:

I claim a hat constructed of flexible material, its rim extended and form retained by means of one or more concavo-convex or corrugated steel hoops, substantially as and for the purpose herein set forth.

44,940.—Artificial Lump Coal.—Richard Covert, Brooklyn, N. Y.:

I claim, as a new article of manufacture, the artificial lump coal consisting of coal dust, asphaltum, and petroleum, mingled by heat and stirring and aggregated by pressure, as herein before described.

44,941.—Cork Hat.—A. C. Crondal, New York City:

I claim a cork hat made of prepared cork, as herein shown and described.

44,942.—Grinding Mill.—Henry P. Crouse, Hartland, Mich.:

I claim a shoe for the hoppers of mill stones, provided with a screen, B, having a partition or barrier, g, attached to it with openings or notches, h h, in its lower edge, in connection with the opening, a, in the bottom of the shoe, and the opening, i, in the front end d the same, ad either with or without the oblong spout, b′, substantially as described.

44,943.—Bee-hive.—Jacob and Henry A. Earhart, Campbellstown, Pa.:

We claim the construction of a hive with the two doors, A B, shelf, F, drawers, E, glass slide, K, cross piece, G, and slats, 1 2 3 4, when these several parts are arranged relatively to each other, and to the hive, specifically in the manner shown and described.

44,944.—Composition for flocking Cloth, Paper, etc.—Amelie Erhard, New York City:

I claim the mixing of the several powders, substantially as above described, with the flocks and the application of the same to the varnished tissue, thus producing the beautiful appearance which the cloth velvet presents, and which combination has never before been known or used.

44,945.—Machine for raising Sheet Metal Pans.—Henry Facks, New York City:

I claim the tilting platform, E, applied in combination with the dies, C, in the manner and for the purpose substantially as herein shown and described.

44,946.—Polishing the Soles of Boots and Shoes.—Othniel Gilmore, Raynham, Mass.:

I claim combining with the polishing or leveling roll or tool a rocking jack for turning the shoe under the action of the roll, substantially as set forth.

And I claim so arranging the jack carriage and the mechanism which impels the polisher, that the polisher has a reciprocating movement but partially over the surface to be polished, while the carriage is fed forough this plane of movement, substantially as described, to bring the entire length of surface to the action of the polisher.

44,947.—Pendulum Sight for Ordnance.—Wm. F. Goodwin, New York City,

I claim, first, A pendulum sight consisting of graduate standards, F F, supported upon a point, D, resting in a cavity, b, in a bracket, B, projecting from the rear of the gun, as herein set forth.

Second, I claim the combination of the arms, H H, with the standards, F F, weight, G, and bracket, B, all constructed, arranged, and operating substantially as and for the purposes specified.

Third, In combination with the graduated standards, F F, and notched slides, S, I further claim the additional graduated extension bar, I, provided with a sighting notch or aperture, l, at its upper end, as described.

Fourth, I claim the pressure rod, g, adapted to operate substantially as and for the purposes described.

Fifth, In combination with a gravitating or pendulum sight and spirit level, M, I claim the tube, N, and outer casing, O, arranged and applied as described.

44,948.—Making Paper Collars.—Allen F. Gray, Boston, Mass.:

I claim a paper collar in which the finished form is given by treatment of the neck band, substantially as set forth.

44,949.—Bee-hive.—Henry A. Hannum, Cazenovia, N. Y.:

I claim the combination and arrangement of the removable angular side, b′ b″, slide, D, and rigid slide, b, of the hive, in such a manner that the interior of the bottom of the hive may be opened, and a lighting board formed for the bees, and a space formed to retain the slide by the angular position of said sides and without the danger of clogging by filth, substantially as herein set forth.

44,950.—Grinding Mill.—C. A. Harper, Canterbury, N. H.:

I claim the arrangement of the bolting chest, Z, reel, X, temper screw, O, main shaft, y, and feed regulator, C, when constructed and operating substantially as described.

44,951.—Machinery for oiling Wool.—George Shaw, Harwood, Newton, Mass.:

I claim, first, The method herein described of oiling wool whilst being fed to a carding or other wool-preparing machine by means of an apparatus attached to and working in unison with said machinery and operating as set forth, by showering or dripping the oil or lubricating compound upon the wool, either directly or through the intermediary of a pressure roller.

Second, The method herein described of oiling wool whilst being fed to a carding or other wool-preparing machinery by means of an apparatus attached to and working in unison with said machinery, and operating as set forth, by first agitating and then showering or dripping the oil or lubricating compound upon the wool, either directly or through the intermediary of a pressure roller.

Third, The method herein described of oiling wool whilst being fed to a carding or other wool-preparatory machinery by means of an apparatus attached to and working in unison with said machinery, and operating by applying the oil or lubricating compound upon the wool in parallel and equidistant lines, substantially in the manner and for the purpose set forth.

Fourth, In combination with carding or other wool-preparing machinery I claim an apparatus for oiling the wool whilst being fed to said machinery, the same consisting of a revolving perforated cylinder arranged for action, substantially as set forth.

Fifth, I claim the combination of a revolving perforated cylinder with internally projecting arms or other means for agitating the oil or lubricating matter before being dripped from the cylinder, substantially as set forth.

Sixth, I claim the revolving oiling cylinder when provided with holes arranged in rectilinear series, in the manner and for the purposes set forth.

44,952.—Machine for preparing Moldings.—Gustave Henze, New York City:

I claim, first, The box, E, provided with a jacket, F, for steam or hot water, and applied in combination with the guide ways, C, and scraper, G, in the manner and for the purpose substantially as herein shown and described.

Second, The endless carrying belt, C′, in combination with the box, E, and scraper, G, constructed and operating substantially as and for the purpose set forth.

Third, Giving to the scraper a beveled edge with flanges projecting over the sides of the molding, substantially as and for the purpose specified.

44,953.—Revolving Fire-arm.—Freeman W. Hood, Worcester, Mass.:

I claim, as my invention, the application of the waste cartridge or shell discharger, E, to the spindle, D, of the magazine, substantially in manner and so as to operate therewith as described.

And in combination with the spindle, D, the discharger, E, and the series of detachable cartridge tubes or carriers, a a a a, etc., combined together and with the barrel and the rotary magazine as set forth, I claim the latching mechanism, so arranged as to serve the double purpose of retaining the cartridge cases and locking the spindle, substantially as explained and represented.

44,954.—Machine for cutting Threads in Nuts.—Wm. W. Hubbard, Philadelphia, Pa.:

I claim, first, A series of taps arranged in a circle, and caused to revolve round the center of the same and round their own axis.

Second, The plate, J, with its chucks, 7, and the dove-tailed recesses in the same, in combination with the said revolving taps.

Third, The combination of the spindles and their taps with the adjustable reservoir, G.

Fourth, The plate, q, arranged beneath the plate, J, substantially as and for the purpose set forth.

Fifth, The plate, H′, with its inclined teeth, tubular projections, r, and spindles, w, in combination with the worm, U.

Sixth, The pinion, T, on the shaft, P, the bevel wheel, N, and cog wheel, M, and sleeves, K, with their pinions, t, the whole being arranged and operating substantially as set forth.

Seventh, The shaft, C, with its wheels, f and h, adapted to each other, as set forth, in combination with the spring treadle, E.

44,955.—Corn Planter.—William G. Kenedy, Greenfield, Ind.:

I claim a seed-dropping or seed-distributing device composed of a slide, O, elastic cut-off, Q, a valve, H, and a spring, L, all arranged and applied so as to be actuated by the driver at the rear of the machine, substantially as set forth.

I further claim the guards, G, when arranged and applied to the machine in relation with the shares, D F F, to operate as and for the purpose specified.

44,956.—Harvester.—M. C. Kilgore, Washington, Iowa:

I claim, first, The box or chamber with its lever and arm and hooks or arms of the shaft, u, for receiving and dropping the grain or sheaf, arranged and operating as set forth.

Second, The horizontal and inclined aprons in combination with the box or chamber having a movable bottom, and with the hooks or arms of the shaft, u, arranged and operated substantially as described.

44,957.—Tool for Watch-repairers.—E. M. Kimball, Toledo, Ohio:

I claim, first, The screw holder consisting of a plate having a system of holes arranged substantially as herein described, for the reception of the screws of a watch, for the purpose herein set forth.

Second, Constructing the said screw-holder with a central foot or pedestal, with a central hole or socket, 14, substantially as and for the purpose specified.

44,958.—Detachable Metal Button.—Thomas Kirk, Waterbury, Conn.:

I claim a button with a detachable eye, which is held to the button by pressure from within the button, substantially as above described.

[This invention consists in constructing a button so that the eye can be detached therefrom and again applied thereto at pleasure, being held in place in the button by spring pressure.]

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44,959.—Ventilator.—S. H. Laman, Willoughby, Ohio:

I claim the special arrangement of the adjustable sections, A and B, and annular chamber, C, and when used in combination with the ventilator, h', and register, H', as and for the purpose set forth.

44,960.—Spring Mattress.—Samuel P. Kittle, of Brooklyn, N. Y.:

I claim, first, The hinging or pivoting the box which contains the springs at two points on each side, at the discance apart of twice the thickness of the stuffing, so that the parts of the box which are folded together may be parallel to each other, the stuffing being inclosed between them, substantially as and for the purpose set forth.

Second, The hinging or pivoting the box which contains the springs at the central point of each side, so that the parts of the box which are folded together may be parallel to each other, the thin covering or stuffing being between them, in combination with the braces or strengthening pieces, P or Q, substantially as and for the purpose set forth.

Third, Combining the central portion of the double hinge, C, or its equivalent, with the ticking of the mattress, in the manner described; that is to say, the said ticking being gathered at each of the joints of said hinge, and secured to and along the middle section thereof, substantially as set forth.

Fourth, The combination and arrangement of the catch, N, with the adjacent slats, F and F, of the box, A, substantially as and for the purpose set forth.

44,961.—Device to Prevent Slipping on Ice.—William R. Landfear, of Hartford, Conn.:

I claim the employment of the elastic band, having connected with it the gritty or frictional substance, to be worn upon the boot or shoe, for the purpose of preventing slipping upon icy or other surfaces, as herein described and set forth.

44,962.—Spring Bed Bottom.—Henry Lathrop, of Utica, N. Y.:

I claim the tracks or ways made in or through, or secured to the frame or box, and the mode of connecting the outermost springs in a bed bottom, seat or other article to the ways or tracks so provided by means of slides, loops or rings, or in any other way, substantially the same which will freely pass or move along the tracks as the action of the springs may require, the whole being arranged as and for the purpose set forth.

44,963.—Pumps.—Edwin Lawrence, of Antrim, N. H.:

I claim the combination of the cylinder with the wings, or piston with flanges, with openings through the shaft, and the double partitions with openings through, and valves upon them, as hereinbefore substantially set forth.

44,964.—Clothes Dryer.—Lorenzo Ling, of Pulaski, N. Y.:

I claim the slides, C, on the arms, B, provided with the recesses, f, in combination with the points or spurs, e, the ends of the flanges, a, of the head, A, and the shoulders, g, on the upper edges of said flanges, all arranged substantially as and for the purpose herein set forth.

[This invention relates to an improvement in that class of clothes-dryers which are composed of adjustable revolving arms, having a line or lines attached. The invention consists in an improvement in the metal head to which the arms are attached, and in using in connection with the head a slide on each arm, all being constructed and arranged in such a manner that the arms will be locked automatically when adjusted, in both an unfolded or working position, and in a folded position, and each arm allowed to work or fold and unfold independently of the others.]

44,965.—Apparatus for Descending Gradients.—Sylvester Marsh, of Chicago, Ill.:

I claim coupling one or more wheels of railway carriages, locomotives or other wheeled vehicle or apparatus with a movable piston or diaphragm of a cylinder filled with air or other more or less elastic fluid, in combination with valves or other equivalent means for regulating the egress from and ingress to, or the displacement in the said cylinder of the contents thereof, substantially as and for the purpose herein set forth.

44,966.—Hot-Air Engines.—Thomas McDonough, of Middletown, Conn.:

I claim the combination of the heaters and coolers with the plunger, by means of which the increased power is utilized, substantially as described.

44,967.—Portable Fence.—Ashley H. Palmer, of Skaneateles, N. Y.:

I claim the use of the stake, B, in combination with the post, A, substantially as and for the purpose described.

I claim the stake, B, in combination with the loop, C, and post, A, when arranged and constructed as herein described.

Also the chamfering the ends of the boards or which enter the posts, substantially as and for the purpose described.

44,968.—Coupling Whiffletrees.—Milton J. Palmer, of Homer, N. Y.:

I claim the arrangement of the flanges, F and G, in combination with the pivot, E, the nut, I, the standards, A B C, the screws, S S, in the manner and for the purposes set forth.

44,969.—Plowing Machine.—Jabish Pierce, of Wyanet, Ill.:

I claim, first, The combination of the plow, F F', clevises, G G', and axle, D, with the frame, A, axle, D', seal, M, and wheels, B, substantially as and for the purposes set forth.

Second, The combination of the lever, H, link, J, clevis, J', and pin, K, the whole being employed in the manner and for the purposes herein specified.

[This invention relates to a method of employing a common plow, in combination with a wagon frame having a seat for the attendant, the object being to provide means whereby weak or infirm persons may be enabled to cultivate the soil in an effectual manner, without being subjected to the fatigue which results from the management of the ordinary plow.]

44,970.—Thermo-Circulating Ventilator.—Isaac Pitman, of Providence, R. I.:

I claim the circuitous circulation of the air of an apartment, from the floor of the same through a heated air chamber, by entering at the bottom of said chamber and passing through in a continuous current, without contact with any falling or counter current, back into said apartment again, for the ultimate purpose of ventilation at a low point of altitude, close to the floor, by the uniform temperature acquired in consequence of the complete circulation of the air, in the manner and by the means herein described.

The ventilation of an apartment at a low point of altitude by a ventilating aperture at or near the floor, in combination with the circuitous circulation of the air by the means and in the manner described herein.

44,971.—Gang Plow.—George Quinn and Lorenz Berkel, of Smithson, Ill.:

We claim, first, The combination of the vertically-adjustable bar E pivoted bar, F, and laterally-adjustable pivoted connections, G e, with the plow beams, H H, all arranged and operating substantially as described.

Second, The combination of the sector-plate supports, G G, with plow beams, H, which are capable of being expanded or contracted laterally, substantially as described.

Third, Securing the axle of the rear-supporting wheel, J, to a lever, h, which is connected to a sector, j, by means of a rod, k, the whole operating substantially as described.

44,972.—Apparatus for Supporting the Pneumatic Springs of Railroad Cars.—S. G. Randall, of New York City:

I claim the combination of an air pump, F, with the platform, A, of a locomotive tender or car and with the boiler, G, and air springs, E, constructed and operating substantially as herein specified, so that the air springs can be supplied with air by the action of steam derived from the boiler, whether the engine or car be in motion or not.

[The object of this invention is for the purpose of keeping the air springs of locomotives and Railroad cars supplied with air, in such a manner that it can be operated by the direct action of the steam from the boiler of the locomotive, whether the train be in motion or not, in contradistinction to an apparatus for the same purpose, the operation of which depends upon the motion of the train, and which will not operate when the train stands still.]

44,973.—Artificial Millstone.—Christopher Rands, of Englewood, N. J.:

I claim an artificial millstone, produced as herein described, as a new article of manufacture.

[This invention consists of a millstone made of hard or insoluble glass, mixed with emery or other similar material, and cast or pressed in a suitable mold, or formed in any other desirable manner, so that by the action of the emery the grinding surface of the stone is prevented from working smooth, and a millstone is obtained which will work for any length of time without being recut or dressed.]

44,974.—Snuff Sifter.—S. G. Rice, of Albany, N. Y.:

I claim, first, The combination of a free breaker with a screen or sieve, substantially as and for the purpose set forth.

Second, The constructing of the free breaker of longitudinal and transverse bars, in such manner that in its vibration over the screening surface the whole of such surface shall be traversed, substantially as described.

Third, Constructing the free breaker of segment form on its under side in a transverse direction, substantially as and for the purpose set forth.

Fourth, So constructing a free breaker and using it in a vibratable sieve or screen that it will traverse the screen longitudinally and laterally, and also rock or roll transversely, substantially as set forth.

44,975.—Machine for Dressing Tobacco.—Saml. G. Rice, of Albany, N. Y.:

I claim, first, A machine for dressing fine-cut or cut tobacco, when adapted for giving a tossing motion to the tobacco, substantially as herein described.

Second, The employment of shelves, D D, in a box, A, arranged and adapted for dressing tobacco, in combination with a sliding frame or frames, C C, substantially as described.

Third, The employment of a covering or bag, c, or its equivalent, in combination with alternately rising and falling shelves, D D, substantially as described.

Fourth, The employment of flexible strips, g g, or their equivalent, in combination with movable shelves, D D, substantially as and for the purposes described.

44,976.—Latches.—Saml. M. Richardson, of New York City:

I claim so constructing the ordinary lockplate with an opening receiving the movable section, l, in combination with the reversable latch, constructed substantially as specified, whereby access is allowed to the latch without uncovering the other parts of the lock, as set forth.

44,977.—Knob Latches.—Saml. M. Richardson, of New York City:

I claim the plate, l, to hold the parts of the lock in position, in combination with the reversible latch and the cap plate, n, as set forth.

44,978.—Pumps.—Philip C. Rowe, of Boston, Mass.:

I claim the employment or use of the two chambers, C C, elastic diaphragm, D, in connection with the induction and eduction passages, e e', communicating with the induction and eduction tubes, H I, provided with valves, g i, and all arranged to operate substantially as and for the purpose herein set forth.

44,979.—Water Coolers.—James C. Sloan, of Camden, N. J.:

I claim the combination of the cock, E and F, and levers, G H and J, with a water cooler, substantially as described.

44,980.—Adjustable Atmospheric Fountain Feeder for Ruling Machines.—Addison Smith, of Perrysburg, Ohio:

I claim a series of adjustable reservoirs, of any shape or material, with atmospheric fountain feeders, each containing a colored ruling fluid (to be attached to ruling machines) for the purpose of ruling colored lines

44,981.—Dampers for Stovepipes.—Gilbert E. Smith, of Racine, Wis.:

I claim the combination of the two circular plates, B C, provided with the openings, c c, and the central opening in B, with the slide, D, or its equivalent, and the rod, d, arranged and operating as shown and described.

44,982.—Sewing Machines.—Earle H. Smith, of Hudson, N. J., and Daniel C. Chapman, of New York City:

We claim the described combination and arrangement of mechanism, or the equivalent thereof, as set forth, wherein the movements of the needle and shuttle are caused to take place with respect to each other, so as to manipulate the threads, in the manner and for the purpose specified

44,983.—Dumping Carts.—R. A. Smith, of Philadelphia, Pa. Ante-dated Oct. 25, 1864:

I claim the body, A, formed, hung to the wheels, and connected to the shaft, all substantially as and for the purposes herein set forth.

44,984.—Cotton Seed Planter.—Basil Spencer, of Lewisburg, Pa.:

I claim the arrangement, construction and combination of the devices, G I J K S and U, as herein described and for the purposes set forth.

44,985.—Vegetable Steamer.—Elias Stangeland, of Rochester, Minn.:

I claim a steamer for agricultural purposes, constructed substantially as above described, containing a perforated pipe, extending from its top to its bottom, a perforated false bottom, D, and perforated bottom, a, and gate, d, closed by a slide, f, or their several equivalents.

[The object of this invention is to produce an apparatus for cooking food for cattle by steam, which can be used for many different substances, and can be made at a small cost.]

44,986.—Method of Decomposing and Desulphurizing Ores.—Robert Spencer, of New York City:

I claim, first, The within-described process of treating ores, consisting in heating, quenching, grinding and amalgamating, substantially as described.

Second, Precipitating the heated ore directly from the kiln into a bath of acidulated liquid previously to the grinding operation, substantially as described.

44,987.—Spring-back Chair.—Robt. H. Staples, of Lowell, Mass.:

I claim the backs of chairs mounted on pivots, in combination with the springs, substantially as described and for the purposes set forth.

44,988.—Self-oiling Spindle Bolster for Spinning Frames.—Erastus N. Steere, of Providence, R. I.:

I claim, first, The annular chamber, formed by cupping out the rail, in combination with the bearing of a spindle bolster, substantially as described.

Second, I claim, in combination with an annular chamber surrounding the bearing of a spindle bolster, as described, a suitable flange or cap, i, as a cover for the same, substantially as described, for the purpose set forth.

Third, I claim the channel or reservoir, H, in combination with a spindle bearing, substantially as described, for the purpose specified.

44,989.—Ore Crushers.—James D. Whelpley, of Boston, Mass.:

I claim the employment of a whirling table, H, provided with radial blades or cutters, J, and forming a bottom to the cylinder in which it revolves, in combination with the flange, h, the inclination, t, and the curvature, s, all constructed and arranged substantially as set forth.

44,990.—Grinding Mills.—James D. Whelpley and Jacob J. Storer, of Boston, Mass.:

We claim, first, The employment of an adjustable valve, f, in a return pipe, V, for regulating the quantity and quality of the yield, substantially as described.

Second, The employment of the trap door, i, the grooved cylinder, H, the spring plate, b, the slide or cover, e, and the beaters, M, in combination with a grinding mill, all constructed and arranged substantially as set forth.

Third, In troducing steam into the collecting chamber, fan-blower, or any part of the mill, for the purpose described.

44,991.—Breech-loading Firearm.—Eli Whitney, of New Haven, Conn.:

I claim, first, So constructing a breech-loading firearm that the breech of the barrel shall be exposed for receiving the charge, and again tightly closed by giving a horizontal (or nearly so) lateral-swinging movement to a pivoted breech check, which has no endwise play, substantially as described.

Second, So applying a laterally-swinging breech check to a breech-loading gun, that when closed it constitutes the upper portion of the neck of the stock, substantially as described.

Third, In a breech-loading arm having a horizontal, laterally-swinging breech check, I claim applying the hammer, hammer spring and check, or their equivalents, to said check, and operating these portions of the lock by means of a trigger applied to the frame, B, substantially as described.

Fourth, In a breech-loading arm, having a horizontal laterally-swinging breech check, I claim the use of a cartridge-case retractor, arranged and operating substantially as described.

Fifth, In a breech-loading arm, having a horizontal laterally-swinging breech check, I claim the slot, s, in said piece, in combination with the slide, b', and retractor, b, substantially as described.

Sixth, In a breech-loading arm, having a horizontal laterally-swinging breech check, C, I claim the employment of a spring latch, e f, or its equivalent, for locking said check in place, substantially as described.

Seventh, Half-cocking the piece, both in the act of opening and closing the breech piece, C, by means of the double-beveled surface, p, substantially as described.

44,992.—Draft Regulators for Steam Boilers.—H. N. Winans, of New York City:

I claim an improved diaphragm, as at a', constructed and arranged substantially as within-described, and for the purposes set forth.

44,993.—Knapsacks.—Oliver Evans Woods, of Philadelphia, Pa.:

I claim, first, A framed knapsack so constructed that the webbing or any articles placed therein will project beyond and around the edges of the frame, to protect the back of the soldier from injury, as explained.

Second, I claim the corner pieces, a a, for permitting the articles contained within the blanket side of the knapsack to be shifted vertically, in the manner and for the purpose explained.

Third, I claim the partition, C C, constructed in any suitable manner, and employed to adapt the articles to be more readily packed and retained in the compartment, A, as described.

Fourth, I claim the adjustable bolts, e' e', whereby the knapsack straps may be shifted to any position, laterally, so as to make them fit the shoulders of the wearer, as stated,

Fifth, I claim the balance loops, H, arranged and employed in the manner and for the object specified.

Sixth, I claim suspending the haversack, D, from the knapsack by means of the hooked straps, d d, or their equivalent, substantially as and for the purposes herein set forth.

Seventh, I claim the straps, E, so constructed that either may be detached and applied adjustably to the haversack, when the latter is to be carried alone, as described.

44,994.—Artificial Fuel.—John H. Cornell (administrator of Jonn Cornell, deceased, assignor to Charles Noble), of Brooklyn, N. Y.:

I claim producing fuel by incorporating the dust or waste of anthracite, bituminous and other coals with a solution of dextrine or starch, and pressing or otherwise forming the composition into lumps or blocks, which are subsequently dried, all as herein set forth.

44,995.—Breech-loading Firearm.—Joshua Gray, of Medford, Mass., assignor to himself, E. H. Eldridge, of Boston, Mass., S. S. Bucklin, of Providence, R. I., and W. G. Langden, of Malden, Mass.:

I claim, first, the combination and arrangement of the breech pin, C, and sliding carrier, B, with the swinging arm, M, the trigger guard lever, H, and its link, I, substantially as shown and described.

Second, A stop or projection, U, at the end of the magazine, or entering the same, for the purpose of retaining cartridges in the magazine, when it is required to use the rifle as a breech-loader, or to extract a charge.

44,996.—Harvesting Machine.—Isaac Hawley, Pekin, Ill., and Daniel S. Stafford, Decatur, Ill., assignors to themselves and S. E. Barber & S. F. Hawley, Pekin, Ill.:

I claim the box, D, provided with a door, d, and applied to the apron frame, C, in connection with a cord or chain, E, all arranged to operate in the manner substantially as and for the purpose herein set forth.

[This invention relates to a new and improved gavel-discharging device to be applied to those harvesters which are provided with end less aprons for discharging the cut grain. The object of the invention is to obtain a simple and economical device which will receive the cut grain from the endless apron and admit of having the grain discharged from it at suitable intervals and in proper sized gavels for binding.]

44,997.—Constructing and Operating Locomotives for Railroads.—Richard P. Morgan (assignor to himself and Richard P. Morgan, Jr.), Chicago, Ill.:

I claim, first, So constructing a locomotive with reference to a railroad constructed as herein described so that none of the supporting wheels need be used as driving wheels, substantially as above shown.

Second, I claim the guide frames, f f, with their pins, g g', in combination with the sliding frames, h h', and slots, w w', by means of which the bearing wheels, b b, may always be drawn from a point in advance thereof, whether the locomotive be moving backward or forward.

Third, I claim the cams, S S, the springs, t t, the rod, u, and the screw, v, for the purpose of producing the requisite pressure of the driving wheels upon the central rail, substantially in the manner and for the purpose described.

Fourth, I claim the use of independent bearing wheels with short axles, in combination with horizontal guide wheels and a central rail, constructed and arranged as above described.

44,998.—Machine for Cutting Files.—Elisha O. Potter (assignor to himself and Charles A. Warland), Pawtucket, R. I.:

I claim my improved file tooth cutting machine as made with the stationary bed, A, the movable cutter carriage, C, the rotary or vibratory cutter stock supporter, F, and the sliding cutter or the stock thereof, arranged and combined substantially in manner and with operative mechanism so as to operate as specified.

I also claim in combination with the machinery for making the cuts or indentations in the file blank a mechanism, substantially as described for automatically varying the inclination of the cutter relatively to the bed, so as to maintain such cutter at the same or approximately the same angle with the varying surface of the file blank during the process of making the teeth thereon, however such surface may differ from a plain surface.

I also claim the arrangement of the lever, g, the pitman, l, and the bar, m, with the frame, B, the spring, G, the cutter carriage, C, or its rotary or vibratory supporter, F, such lever, pitman, and bar, being mechanism for varying the pressure or active power of the spring by which the blow of the cutter is obtained.

I also claim the mechanism or combination for varying the feed of the cutter as occasion may require, such combination consisting of the shaper, f', the plates, b' c', bar, d', and the stud, e' e', the whole being applied together and to the movable rack, M, and the cutter carriage, substantially as and so as to operate as described.

I claim the combination composed of the following mechanical elements, viz:—1. A stationary bed; 2. A mechanism for moving the cutter longitudinally over the file blank; 3. A mechanism substantially as described or its equivalent, for varying the feed of the cutter as occasion may require.

I also claim the mechanism or combination for so varying the inclination of the cutter relatively to the bed, so as to maintain such cutter at the same or approximately the same angle with the varying surface of the file blank, during the process of making the teeth thereof, such combination consisting of the slotted plate, H, the toggles I K, and the rotary or vibratory supporter, F, or their mechanical equivalents, they being combined together and with the frame, B, and the cutter carriage, substantially in manner and so as to operate as specified.

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44,999.—Combined Cartridge and Percussion Cap Box.—J. T. Warren, Stafford, N. Y., and Robert A. Chesebrough, New York City, assignors to said Robert A. Chesebrough:

We claim the construction and combination of the case, G, and revolving box, L, constructed, combined, and operating as herein described and for the purposes set forth.

45,000.—Hand-printing Press.—Cullen Whipple, Providence, R. I., assignor to John W. Fielder, Boston, Mass.:

I claim the ink-pad beneath the sliding bed, the sliding bed, the secondary lever, and their connections, in combination with the printing lever, all made and operating substantially as set forth or their mechanical equivalents.

45,001.—Process for the Manufacture of Good Flavored Spirits and Neutral Alcohol.—Francois Haeck, Brussels, Belgium. Patented in Belgium July 17, 1862:

I claim, first, The process of separating injurious constituents from phlegms or other alcoholic liquid prior to distillation by diluting it, permitting it to rest, and decantation, substantially as set forth

Second, I also claim the process of separating injurious constituents from phlegms, or other alcoholic liquid, prior to distillation, by treating it with gypsum or its equivalent, substantially as set forth.

Third, I also claim the process of separating from phlegm, or other alcoholic liquid, injurious constituents which volatilize at a lower heat than alcohol by subjecting the phlegm to continued heating at a lower temperature than is required for the distillation of alcohol, prior to the distillation, substantially as set forth.

Fourth, I also claim the process of separating the injurious constituents from phlegm, or other alcoholic liquid prior to distillation, by the combination of the three secondary sub-processes of dilution and decantation, treatment with gypsum or its equivalent, and heating at a temperature lower than is required for the distillation of alcohol, substantially as set forth.

Fifth, I also claim the process of distilling phlegm, or other alcoholic liquid, by two consecutive simultaneous and continuous distillations (the first at the lowest practicable temperature required to disengage the alcohol in vapor, and the second at a temperature sufficient to expel the remaining alcohol), and of condensing the products of each distillation in a separate vessel, so that they do not mingle, substantially as set forth.

Sixth, I also claim the process of distilling phlegm, or other alcoholic liquid, substantially as specified in the last preceding claim, in combination with the process of separating the injurious constituents prior to distillation, substantially as specified in the fourth claim.

Seventh, I also claim the process of distilling phlegm, or other alcoholic liquid, substantially as specified in the fifth claim, in combination with each of the preliminary separating processes specified in the first, second, and third claims.

45,002.—Apparatus for Concentrating and Analyzing Alcoholic Liquids.—Francois Haeck, Brussels, Belgium. Patented in Belgium July 17, 1862:

I claim the concentrating analyzing apparatus herein described, consisting substantially of a series of chambers, analyzing channels, and return pipes, arranged within a vessel having double sides between which the cooling fluid is contained, substantially as set forth.

I also claim the construction of the vessels and pans and partitions forming analyzing channels, as herein set forth in such a manner that they may be withdrawn from the vessel that contains them for the purpose of being cleansed.

45,003.—Refrigerating Condenser for Distillers.—Francois Haeck, Brussels, Belgium. Patented in Belgium Aug. 16, 1859:

I claim the refrigerating condenser hereinbefore described, constructed of parts enclosing a thin chamber for the reception of the vapor to be condensed and exposing broad condensing surfaces, in such manner that the parts may be separated to permit the condensing surfaces to be readily cleansed; the said condenser being provided with pipes for the supply and removal of the refrigerating fluid, and for the supply and removal of the fluid to be condensed, all operating substantially as set forth.

I also claim the combination of the aforesaid condenser with pipes for the escape of air, substantially as set forth.

45,004.—Apparatus for Cooling and Aerating Liquids.—Francois Haeck, Brussels, Belgium. Patented in Belgium Aug. 16, 1859:

I claim the cooler hereinbefore described containing a thin chamber for the liquid to be cooled, thin chambers for the cooling liquid, a perforated gutter or its equivalent to distribute the liquid to be cooled, a pipe for its escape, and suitable means for the supply and escape of the cooling liquid, all the parts being constructed substantially as set forth.

I also claim the oxygenator hereinbefore described, composed substantially of two chambers and perforated tubes through which tubes air is drawn by the flow of the liquid, all constructed substantially as set forth.

I also claim the combination of the cooler and oxygenator as described, so that the liquid may be cooled and oxygenated at one continuous operation.

45,005.—Bottle Stopper.—Peter R. Higley, Oshawa, C. W.:

I claim, first, A valve stopper composed of a frame, B b, packing, C, and cylinder, G, the latter having an aperture, g2, and adapted to slide within said frame so as to open communication with the bottle and pressed upward by a spiral spring, H, to close the same, substantially as set forth.

Second, I claim the metallic frame, B b, constructed as herein specified and adapted for the application of an elastic packing, C.

Third, In combination with a stopper constructed as herein described, I claim the double link or hinge, F F, and the yoke, D, both being attached to the collar, E, and employed in the manner and for the purposes specified.

45,006.—Composition for Protecting Ship's Bottoms.—Marius Vian, Marseilles, France:

I claim as new the herein described compound called feno-manganic mixture to be applied to the bottom of iron or iron-plated ships or vessels, in the manner and for the purpose of protecting the parts thus coated against oxidation and incrustation, substantially as set forth.

DESIGNS.

1,995.—Paint Can.—Charles F. Brand (assignor to Harrison, Brothers & Co.), Philadelphia, Pa.:

1,996.—Trunk Cover.—Henry Braunhold, New York City:

1,997.—Ink Bottle.—George G. Percival, M.D., Brooklyn, N. Y.:

RE-ISSUES.

1,806.—Lock.—Wm. H. Akins, Dryden, N. Y. Patented May 13, 1856:

I claim so arranging a series of revolving disks, c c, upon a fixed stud or bearing, D, that each in turn shall be made the means of adjusting the position of the next, the whole being operated by a turning shaft, F, substantially as herein specified.

In combination with a series of disks, c c, arranged and operating as above described, I also claim the stationary washers, e e, for keeping the disks apart, substantially as herein set forth.

I also claim altering the respective numbers of two or all the disks, c, by the simple change of an adjustable projection or pin from one hole to another, substantially as herein described.

I also claim the method herein described of discovering the proper numbers to open the lock, substantially as specified.

1,807.—Wringing or Squeezing Machine.—Shelden A. Bailey, Simeon S. Cook and Benedict M. Cook, Smithfield, R. I., assignees by mesne assignments of John Alender, New London, Conn. Patented Jan. 11, 1859:

I claim, first, A roller so constructed as to yield more at its center than at or near its ends in combination with a covering of vulcanized rubber of tubular form, as and for the purpose set forth.

Second, Cog wheels in combination with vulcanized rubber rollers or any other elastic substance or compounds impervious to water.

1,808.—Operating Guns and Gun Towers.—James B. Eads, St. Louis, Mo. Patented March 31, 1863. Reissued Sept. 15, 1863:

I claim depressing and elevating the aim of the gun whilst the muzzle is kept at or near the center of the port-hole, by raising and lowering the carriage of said gun, substantially in the manner and for the purposes herein described.

And I also claim controlling the muzzle of the gun by means of the tripping pan, and the guide bar on the turret whereby the muzzle of the gun may be guided fairly into the port and the size of the port be greatly reduced, substantially as described.

1,809.—Operating Guns and Gun Towers.—James B. Eads, St. Louis, Mo. Patented March 31, 1863. Reissued Sept. 15, 1863:

I claim the use of a central steam joint in connection with a revolving gun tower in which the cylinders and appliances for working the gun or guns rotate with the tower; the steam joint being for the purpose of connecting the rotating pipes and cylinders within the tower with the stationary pipes outside of the tower, substantially and in the manner described.

1,810.—Operating Guns and Gun Towers.—James B. Eads, St. Louis, Mo. Patented March 31, 1863. Reissued Sept. 15, 1863:

I claim so combining a revolving tower with a gun or guns, and with one or more steam cylinders and pistons and their necessary appliances, as that the gun or guns may be raised or lowered by steam, with or independent of the tower, and so that the tower, gun or guns, and cylinder, may be turned by steam horizontally, or the main cylinder remain fixed whilst the tower is revolved around it, as may be preferred and substantially as described.

1,811.—Operating Guns and Gun Towers.—James B. Eads, St. Louis, Mo. Patented March 31, 1863. Reissued Sept. 15, 1863:

I claim, first, Causing the recoil of the gun to open the exhaust part of the cylinder that runs it out and in, after the recoil has been checked by the steam, substantially as described.

Second, Causing the least movement of the gun in either direction out or in, after the recoil, to open the proper steam part and thus check its further motion until the operator is ready to move it as he may desire, substantially as described.

Third, Connecting the gun frame in such manner with the valve of the steam cylinder supporting the gun frame, as to make the valve self-acting by causing the last descent of the gun frame to open the inlet port and admit more steam, and to close the port when sufficient steam is admitted and to open the exhaust port if the cylinder have an excess of steam and the frame should begin to rise above the point at which it was fixed; thus allowing the frame to be fixed at any particular point whilst the valve gear is at the same time entirely under the control of the operator, substantially as described.

Fourth, The construction of the valve gear of the large cylinder in such manner that the inlet port shall be opened in case of the accidental descent of the gun frame, and thus check it without further injury, substantially as described.

1,812.—Operating Guns and Gun Towers.—James B. Eads, St. Louis, Mo. Patented March 31, 1863. Reissued Sept. 15, 1863:

I claim making a gun tower in sections so that the top section may be lowered into the hold of the vessel, for the purpose and in the manner substantially as herein described.

1,813.—Stove.—Dennis G. Littlefield, Albany, N. Y. Patented Jan. 24, 1854. Re-issued Nov. 19, 1861. Again Aug. 26, 1862. Again March 3, 1863:

I claim the combination of a fuel-supplying cylinder with a fire-pot, when the said supplying cylinder has its cover opening inclosed within a chamber or space communicating not only with the outlet from the fire-pot, but also with the exit flue, substantially as herein described, when the case forming said inclosing chamber becomes a part of the stove itself, and is so constructed, united, and combined with other parts of the stove, as to form a complete manufactured article or a structure having vitality as a complete individual thing for the combustion of anthracite and other concentrated fuel, substantially in the manner and for the purpose herein specified.

1,814.—Stove.—Dennis G. Littlefield, Albany, N. Y. Patented Jan. 24, 1854. Re-issued Nov. 19, 1861. Again Aug. 26, 1862. Again March 3, 1863:

I claim the arrangement, adaptation, and combination with a fuel-supplying cylinder stove, of an illuminating case to the chamber which receives light, and the gaseous products of combination from the burning fuel; when said case is illuminated by windows or glazed apertures arranged continuously upon every side, or in so much of its surface as may be fully exposed to view, substantially in the manner and for the purpose herein set forth.

1,815.—Stove.—Dennis G. Littlefield, Albany, N. Y. Patented Jan. 24, 1854. Re-issued Nov. 19, 1861. Again Aug. 26, 1862. Again May 19, 1863:

I claim, first, A fire-pot constructed substantially as described, in combination with a fuel-supplying cylinder, having its cover opening surrounded by a chamber which communicates with the outlet from the fire-pot, and also with the flue leading to the chimney, when the openings in the fire-pot, or outlets therefrom, are broadest at the bottom, as and for the purpose specified.

Second, The combination of a fire-pot constructed substantially as described, with a fuel-supplying cylinder, which has its cover opening surrounded by a chamber which communicates with the outlet from the fire-pot, and also with the flue leading to the chimney, when the aggregate amount of outlet space from the fire-pot exceeds the amount of inlet, as and for the purpose specified.

1,816.—Bed Canopy.—Isaac E. Palmer, Middletown, Conn.:

I claim, first, The combination of the grasping base, A A′ a a′, with the standard, substantially as herein described irrespective of the construction of the standard.

Second, The extending frame of the canopy consisting of ribs, F F, pivoted at their center, and a hoop or band, C, connected to said ribs by metal clasps, all combined substantially as herein specified.

1,817.—Machine for Making Paper Twine, etc.—John B. Wortendyke, Godwinville, N. J. Patented May 24, 1864:

I claim performing the twisting operation while the paper is in a moistened state, substantially as and for the purpose herein set forth.

1,818.—Machine for Making Paper Twine, etc.—John B. Wortendyke, Godwinville, N. J. Patented May 24, 1864:

I claim, first, The moistening of the paper of which the twine is to be formed, while on its way over or between the rolls by which it is delivered to the spindle or throstle by which the twisting is performed, substantially as herein described.

Second, The employment in a machine for making twine or cord from paper, of a paper guide, E, or other equivalent device, for gathering up the paper edgewise, or laterally, in the form of roping, substantially as herein described, on its way to a spindle, throstle, or other twisting device.

Third, The grooving of the roller, B, substantially as and for the purpose herein specified.

TO OUR READERS.

INVARIABLE RULE.—It is an established rule of this office to stop sending the paper when the time for which it was pre-paid has expired.

MODELS are required to accompany applications for Patents under the new law, the same as formerly, except on design patents, when two good drawings are all that are required to accompany the petition, specification and oath, except the Government fee.

RECEIPTS.—When money is paid at the office for subscriptions, a receipt for it will always be given; but when subscribers remit their money by mail, they may consider the arrival of the first paper a *bona-fide* acknowledgement of our reception of their funds.

PATENTS

GRANTED

FOR SEVENTEEN YEARS

MUNN & COMPANY,

In connection with the publication of the SCIENTIFIC AMERICAN, have acted as Solicitors and Attorneys for procuring "Letters Patent" for *new inventions* in the United States and in all foreign countries during the past *seventeen years*. Statistics show that nearly ONE-THIRD of all the applications made for patents in the United States are solicited through this office; while nearly THREE-FOURTHS of all the patents taken in foreign countries are procured through the same source. It is almost needless to add that, after *seventeen years'* experience in preparing specifications and drawings for the United States Patent Office, the proprietors of the SCIENTIFIC AMERICAN are perfectly conversant with the preparation of applications in the best manner, and the transaction of all business before the Patent Office; but they take pleasure in presenting the annexed testimonials from the three last ex-Commissioners of Patents.

MESSRS. MUNN & CO.:—I take pleasure in stating that, while I held the office of Commissioner of Patents, MORE THAN ONE-FOURTH OF ALL THE BUSINESS OF THE OFFICE CAME THROUGH YOUR HANDS. I have no doubt that the public confidence thus indicated has been fully deserved, as I have always observed, in all your intercourse with the office, a marked degree of promptness, skill, and fidelity to the interests of your employers. Yours very truly,

CHAS. MASON.

Judge Mason was succeeded by that eminent patriot and statesman, Hon. Joseph Holt, whose administration of the Patent Office was so distinguished that, upon the death of Gov. Brown, he was appointed to the office of Postmaster-General of the United States. Soon after entering upon his new duties, in March, 1859, he addressed to us the following very gratifying letter.

MESSRS. MUNN & CO.:—It affords me much pleasure to bear testimony to the able and efficient manner in which you discharged your duties as Solicitors of Patents, while I had the honor of holding the office of Commissioner. Your business was very large, and you sustained (and I doubt not justly deserved) the reputation of energy, marked ability, and uncompromising fidelity in performing your professional engagements.

Very respectfully, your obedient servant,

J. HOLT.

Hon. Wm. D. Bishop, late Member of Congress from Connecticut, succeeded Mr. Holt as Commissioner of Patents. Upon resigning the office he wrote to us as follows:

MESSRS. MUNN & CO.:—It gives me much pleasure to say that, during the time of my holding the office of Commissioner of Patents, a very large proportion of the business of inventors before the Patent Office was transacted through your agency; and that I have ever found you faithful and devoted to the interests of your clients, as well as eminently qualified to perform the duties of Patent Attorneys with skill and accuracy. Very respectfully, your obedient servant,

WM. D. BISHOP.

THE EXAMINATION OF INVENTIONS.

Persons having conceived an idea which they think may be patentable, are advised to make a sketch or model of their invention, and submit it to us, with a full description, for advice. The points of novelty are carefully examined, and a written reply, corresponding with the facts, is promptly sent, free of charge. Address MUNN & CO., No. 37 Park Row, New York.

As an evidence of the confidence reposed in their Agency by inventors throughout the country, Messrs. MUNN & CO. would state that they have acted as agents for more than TWENTY THOUSAND inventors! In fact, the publishers of this paper have become identified with the whole brotherhood of inventors and patentees, at home and abroad. Thousands of inventors for whom they have taken out patents have addressed to them most flattering testimonials for the services rendered them; and the wealth which has inured to the individuals whose patents were secured through this office, and afterwards illustrated in the SCIENTIFIC AMERICAN, would amount to many millions of dollars! Messrs. MUNN & CO. would state that they never had a more efficient corps of Draughtsmen and Specification Writers than those employed at present in their extensive offices, and that they are prepared to attend to patent business of all kinds in the quickest time and on the most liberal terms.

PRELIMINARY EXAMINATIONS AT THE PATENT OFFICE.

The service which Messrs. MUNN & CO. render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like invention has been presented there; but is an opinion based upon what knowledge they may acquire of a similar invention from the records in their Home Office. But for a fee of $5, accompanied with a model, or drawing and description, they have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a patent, &c., made up and mailed to the inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through the Branch Office of Messrs. MUNN & CO., corner of F. and Seventh streets, Washington, by experienced and competent persons. Many thousands of such examinations have been made through this office, and it is a very wise course for every inventor to pursue. Address MUNN & CO., No. 37 Park Row, New York.

HOW TO MAKE AN APPLICATION FOR A PATENT.

Every applicant for a patent must furnish a model of his invention if susceptible of one; or, if the invention is a chemical production, he must furnish samples of the ingredients of which his composition consists, for the Patent Office. These should be securely packed, the inventor's name marked on them, and sent, with the Government fees, by express. The express charge should be pre-paid. Small models from a distance can often be sent cheaper by mail. The safest way to remit money is by a draft on New York, payable to the order of Messrs. MUNN & CO. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but, if not convenient to do so, there is but little risk in sending bank bills by mail, having the letter registered by the postmaster. Address MUNN & CO., No. 37 Park Row New York.

Patents are now granted for SEVENTEEN years, and the Government fee required on filing an application for a patent is $15. Other changes in the fees are also made as follows:—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Re-issue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing a Disclaimer	$10
On filing application for Design (three and a half years)	$10
On filing application for Design (seven years)	$15
On filing application for Design (fourteen years)	$30

The Patent Laws, enacted by Congress on the 2d of March, 1861.

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now in full force, and prove to be of great benefit to all parties who are concerned in new inventions.

The law abolishes discrimination in fees required of foreigners, excepting natives of such countries as discriminate against citizens of the United States—thus allowing Austrian, French, Belgian, English, Russian, Spanish and all other foreigners, except the Canadians, to enjoy all the privileges of our patent system (except in cases of designs) on the above terms. Foreigners cannot secure their inventions by filing a caveat; to citizens only is this privilege accorded.

CAVEATS.

Persons desiring to file a caveat can have the papers prepared in the shortest time by sending a sketch and description of the invention. The Government fee for a caveat is $10. A pamphlet of advice regarding applications for patents and caveats is furnished gratis, on application by mail. Address MUNN & CO., No. 37 Park Row, New York.

REJECTED APPLICATIONS.

Messrs. MUNN & CO. are prepared to undertake the investigation and prosecution of rejected cases, on reasonable terms. The close proximity of their Washington Agency to the Patent Office affords them rare opportunities for the examination and comparison of references, models, drawings, documents, &c. Their success in the prosecution of rejected cases has been very great. The principal portion of their charge is generally left dependent upon the final result.

All persons having rejected cases which they desire to have prosecuted, are invited to correspond with MUNN & CO., on the subject, giving a brief history of the case, inclosing the official letters, &c.

FOREIGN PATENTS.

Messrs. MUNN & CO., are very extensively engaged in the preparation and securing of patents in the various European countries. For the transaction of this business they have offices at Nos. 66 Chancery lane, London; 29 Boulevard St. Martin, Paris; and 26 Rue des Eperonniers, Brussels. They think they can safely say that THREE-FOURTHS of all the European Patents secured to American citizens are procured through their agency.

Inventors will do well to bear in mind that the English law does not limit the issue of patents to inventors. Any one can take out a patent there.

Circulars of information concerning the proper course to be pursued in obtaining patents in foreign countries through MUNN & CO'S Agency, the requirements of different Government Patent Offices, &c., may be had, gratis, upon application at the principal office, No. 37 Park Row, New York, or any of the branch offices.

SEARCHES OF THE RECORDS.

Having access to all the official records at Washington, pertaining to the sale and transfer of patents, MESSRS. MUNN & CO., are at all times ready to make examinations as to titles, ownership, or assignments of patents. Fees moderate.

INVITATION TO INVENTORS.

Inventors who come to New York should not fail to pay a visit to the extensive offices of MUNN & CO. They will find a large collection of models (several hundred) of various inventions, which will afford them much interest. The whole establishment is one of great interest to inventors, and is undoubtedly the most spacious and best arranged in the world.

MUNN & CO. wish it to be distinctly understood that they do not speculate or traffic in patents, under any circumstances; but that they devote their whole time and energies to the interests of their clients.

COPIES OF PATENT CLAIMS.

MESSRS. MUNN & CO., having access to all the patents granted since the rebuilding of the Patent Office, after the fire of 1836, can furnish the claims of any patent granted since that date, for $1.

THE VALIDITY OF PATENTS.

Persons who are about purchasing patent property, or patentees who are about erecting extensive works for manufacturing under their patents, should have their claims examined carefully by competent attorneys, to see if they are not likely to infringe some existing patent, before making large investments. Written opinions on the validity of patents, after careful examination into the facts, can be had for a reasonable remuneration. The price for such services is always settled upon in advance after knowing the nature of the invention and being informed of the points on which an opinion is solicited. For further particulars address MUNN & CO., No. 37 Park Row New York.

EXTENSION OF PATENTS.

Many valuable patents are annually expiring which might readily be extended, and if extended, might prove the source of wealth to their fortunate possessors. Messrs. MUNN & CO. are persuaded that very many patents are suffered to expire without any effort at extension, owing to want of proper information on the part of the patentees, their relatives or assigns, as to the law and the mode of procedure in order to obtain a renewed grant. Some of the most valuable grants now existing are *extended patents*. Patentees, or, if deceased, their heirs, may apply for the extension of patents, but should give ninety days' notice of their intention

Patents may be extended and preliminary advice obtained, by consulting or writing to MUNN & CO., No. 37 Park Row, New York.

ASSIGNMENTS OF PATENTS.

The assignment of patents, and agreements between patentees and manufacturers, carefully prepared and placed upon the records at the Patent Office. Address MUNN & CO., at the Scientific American Patent Agency, No. 37 Park Row, New York.

UNCLAIMED MODELS.

Parties sending models to this office on which they decide not to apply for Letters Patent and which they wish preserved, will please to order them returned as early as possible. We cannot engage to retain models more than one year after their receipt, owing to their vast accumulation, and our lack of storage room. Parties, therefore, who wish to preserve their models should order them returned within one year after sending them to us, to insure their obtaining them. In case an application has been made for a patent the model is in deposit at the Patent office, and cannot be withdrawn.

It would require many columns to detail all the ways in which the Inventor or Patentee may be served at our offices. We cordially invite all who have anything to do with patent property or inventions to call at our extensive offices, No. 37 Park Row, New York, where any questions regarding the rights of Patentees, will be cheerfully answered.

Communications and remittances by mail, and models by express (prepaid) should be addressed to MUNN & CO. No. 37 Park Row, New York.

Notes and Queries

A. M., of N. Y.—Your definitions of a wheel and of a pinion are correct, but your definition of a bevel gear is incorrect. The sense in which this term is generally employed by mechanics in our workshops corresponds precisely with its definition by the best lexicographers. Webster says, "Bevel (French *biveau*), An angle that is not a right angle is called a bevel angle whether obtuse or acute." He cites as authority for this definition Bailey, Johnson, and the Encyclopedia. Nicholson defines bevel-gear as "Wheel-work whose cogs stand beveling, or at an oblique angle to the shaft." Brande's definition of bevel-gear is, "In mechanics, a species of wheel-work, in which the axes of two wheels working into each other are neither parallel nor perpendicular, but inclined to one another in a certain angle." A miter wheel is one kind of bevel wheel, that kind in which the teeth are inclined at an angle of 45 degrees.

T. M., of Pa.—The written agreement to which you allude in reference to the management and sale of your patent having been signed and sealed by both contracting parties, cannot be altered by parole evidence. The agreement must explain itself, and you have now no remedy in law for any omission.

P. A., of Mass.—The invention described in your letter for opening and closing shutters on buildings by means of a knob and spindle on the inside is quite old. We think a patent can be obtained for the amalgamator, and we have forwarded by mail the necessary instructions.

W. N. A., of Pa.—The method of preparing barrels to which you refer for holding refined oil, is patented, and no one has a right to use it without the patentee's consent.

D. L., of Mass.—Paraffin is an oily substance distilled from cannel coal. The product when dissolved in a mixture of hydro-carbons is largely used for lubricating machinery.

M. S. B., of Mass.—If, as you say, the method of sending a cipher message described in a recent number is 2,000 years old, it must by this time be quite new, and is therefore a very good one.

C. H. W., of Conn.—A double threaded screw runs no faster through a nut than a single threaded one of the same pitch. Double or triple thread screws are the only means of cutting extraordinarily quick pitches on small rods or shafts.

J. D. R., of N. S.—Lumber is frequently dried in steam heated kilns. Address Messrs. H. Oliver & Co., Box 93, New Haven.

J. M., of N. Y.—Your idea of an iron-clad locomotive is not new, and the possibility of taking Richmond by building a railroad in a trench and running the engine up to it, is, we fancy, rather remote.

W. H. W., of Mass.—The path of a body projected upward from the earth in any direction other than a vertical one is a parabola, except as it is modified by the resistance of the air.

J. E. G., of R. I.—As your article repeats very nearly the ideas of your former communication we do not publish it.

J. T. S., of N. Y.—You had better order a preliminary examination of your sliding cylinder engine. There is some doubt about it, as that principle has been used in many cases. As you have now stated the case the engine would not work; the cylinder would slide back and forth between the two pistons without stirring the crank-shaft, unless its resistance were less than that of wo packe[illegible]ns, which is unlikely. You have got an idea, somewhere, work it out. We cannot tell you who makes duck guns. Your ideas about them will doubtless be acceptable. We n tell better when we see them.

J. M., of Kansas.—A common steam engine could be worked by compressed air, but if the power that you have is not sufficient to drive your mill, you would lose a portion of it by using it first to compress air into a reservoir, and then employing that compressed air to work an engine. There would be a consumption of power in friction, in overcoming inertia of the parts, and in developing heat by the compression, without any corresponding gain.

M. V. B. P., of Canada East.—Powdered plumbago is simply dusted over the wax molds for electrotype castings. There is only one man in the country who prepares plumbago fine enough for this use.

Money Received

At the Scientific American Office, on account of Patent Office business, from Wednesday, Nov. 2, 1864, to Wednesday. Nov. 9, 1864:—

Z. W., of N. J., $250; A. H., of N. Y., $40; G. F. W., of Mo., $20; J. S., of N. Y., $15; T. B. G., of N. Y., $20; V. D. S., of Iowa, $20; J. K., of N. Y., $20; A. W., of N. Y., $45; B. S., of N. Y., $25; C. E. S., of Iowa, $20; J. R. M. S., of N. V., $15; H. L., of Ind., $20; A. W. H., of N. Y., $20; W. N. B., of Ind., $20; W. F. R., of N. Y., $16; T. M. L., of N. Y., $16; K. & L., of R. I., $65; J. P. N., of N. J., $25; J. H. J., of Ohio, $16; T. W. H., of Wis., $30; A. P. K. W., of Mass., $25; D. & R., of Conn., $30; H. K. W., of Vt., $25; S. E. H., of Conn., $16; B. C., of N. Y., $25; G. F. J. C., of N. J., $25; J. F. D., of N. Y., $25; S. A. M., of Ohio, $20; H. J D., of N. Y., $20; G. W. B., of Ohio, $20; O. P. F., of N. Y., $20; G. B., of N. Y., $15; J. C., of Conn., $55; H. & B., of N. Y., $40; G. B. F., of N. Y., $15; A. P., of Wis., $20; T. W., of Ill., $20; I. E. A. R., of Cal., $20; O. S., of N. Y., $20; E. T., of Pa., $30; J. S. T., of N. Y., $30; J. E. M., of Ill., $15; S. R., of Pa., $16; R. R. V. J., of Ohio, $25; W. T., of Ill., $16; D. B. N., of Ind., $20; I. N. V., of Cal., $30; L. B. L., of Cal., $25; A W. L., of N. Y., $15; J. P. E., of Ohio, $25; H. H., of Conn., $30; G. A. McC., of N. Y., $25; R. N., of N. Y., $25; P. L., of N. Y., $25; P. &I., of Mass., $20; L. A. C., of N. Y., $40; H. P., of N. Y., $40; C. & T., of Conn., $20; W. & S., of N. Y., $45; E W. M., of Ill., $20; A. F. H., of Mass., $20; G. F. J. C., of N. J., $15; R. D., of Mich., $20; K. & E., of Iowa, $45; J. W., of Cal., $36; A. S., of N. Y., $48; W. S., of Mich., $25; B. J., of N. J., $15; J. R., of N. H., $25; D. C. A., of Iowa, $16; F. G. S., of Mass., $25; H. B. B., of Mass., $16; J. S. F., of Nevada, $12; S. & B., of Mich., $16; C. L., of Ill., $20; J. H. P., of Conn., $30; O. B., of N. Y., $25; J. H. P., of N. Y., $15; J. W., of N. Y., $25; L. A. C., of N. Y., $25; D. C. S., of N. Y., $40; G. C., of N. Y., $16; I. S. S., of N Y., $20; W. W. P., of Ill., $20; M. & R., of N. Y., $40; P. & H., of N. Y., $25; C. D. B., of Mich., $25; A. A. S., of N. Y., $539; J. B., of N. Y., $40; S. G. S., of Pa., $50; B. S. H., of N. Y., $10; P. P., of N. Y., $25; R. N., of N. Y., $40; W. B., of Iowa, $20; R. S. F., of N. Y., $15; R. & K., of N. Y., $20.

Persons having remitted money to this office will please to examine the above list to see that their initials appear in it, and if they have not received an acknowledgment by mail, and their initials are not to be found in this list, they will please notify us immediately, stating the amount and how it was sent, whether by mail or express.

Specifications and drawings and models belonging to parties with the following initials have been forwarded to the Patent Office, from Wednesday, Nov. 2, 1864, to Wednesday, Nov. 9, 1864:—

Z. W., of N. J.; H. & B., of N. Y.; J. R., of N. H.; D. B. N., of Ind.; J. S. F., of Nevada; H. B., of Mass.; G. A. McC., of N. Y.; R. N., of N. Y.; P. P., of N. Y.; H. K. W., of Vt.; J. F. D, of N. Y.; J W., of Cal.; K. & L., of R. I.; T. W. H., of Wis.; E. T., of Pa.; C L., of Ill.; J. W., of N. Y.; J. B., of N. Y.; C. D. B., of Mich.; J. P. E., of Ohio; P. L., of N. Y.; F. G. S., of Mass.; I. N. V., of Cal.; W. S., of Mich.; B. C., of N. Y.; G. F. J. C., of N. J.; L. A. C., of N. Y.; J. H. P., of Conn.; P. S. H., of N. Y.; A. H., of N. Y.; H. P., of N. Y.; D. & R., of Conn.; R. V. J., of Ohio; J. G., of Md.; A. K. P. W., of Mass.; J. S. T., of N. Y.; H. C. R., of Ill.; I. S. S., of N. Y.; M. & W. B. G., of N. J.; O. B., of N. Y.

Back Numbers and Volumes of the "Scientific American."

VOLUMES III., IV., VII., AND X., (NEW SERIES) complete (bound) may be had at this office and from periodical dealers. Price, bound, $2 25 per volume, by mail, $3—which includes postage. Every mechanic, inventor or artisan in the United States should have a complete set of this publication for reference. Subscribers should not fail to preserve their numbers for binding VOLS. I., II., V., VI. and VIII. are out of print and cannot be supplied.

BINDING.—Those of our subscribers who wish to preserve their numbers of the SCIENTIFIC AMERICAN for future reference, can have them substantially bound in heavy board sides, covered with marbled paper, and leather backs and tips, for 75 cents per volume.

PATENT CLAIMS.—Persons desiring the claim of any invention which has been patented within thirty years, can obtain a copy by addressing a note to this office, stating the name of the patentee and date of patent, when known, and enclosing $1 as fee for copying. We can also furnish a sketch of any patented machine issued since 1853, to accompany the claim, on receipt of $2. Address MUNN & CO., Patent Solicitors, No. 37 Park Row, New York.

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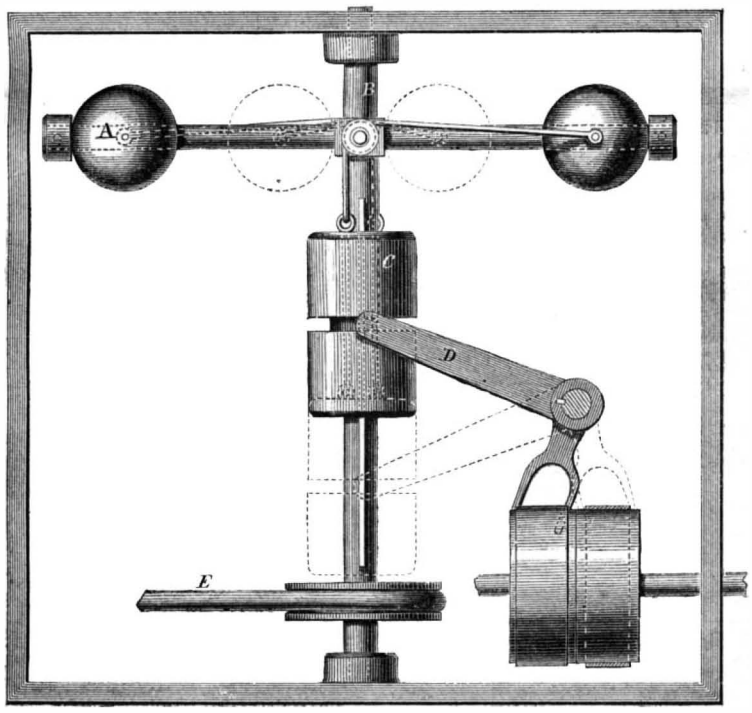
When cloth is passed through the rolls of rotary fulling mills it has a tendency to twist and knot before it reaches the rolls, so that the upper, or pressure roll, stops, thus causing a tearing motion which injures the cloth. The object of this invention is to construct a stop motion so that when the cloth shall get knotted the belt will be thrown off the mill instantly, and thus preserve the cloth from injury. This action is obtained by connecting the balls, A, on the arms of the spindle, B, by cords to a weight, C. The groove in this weight carries the lever, D, which has a forked arm to ship the belt with. When these balls are revolved at a high velocity by the belt, E, they



STOTT'S FULLING-MILL STOP-MOTION.

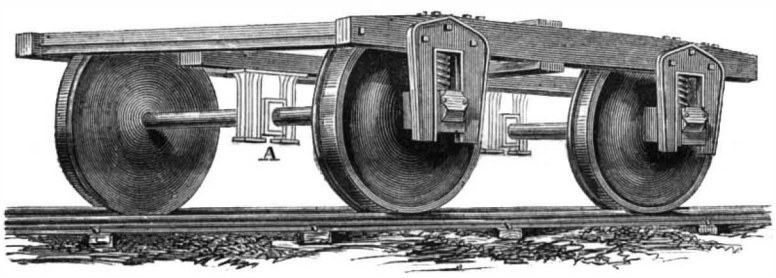
fly out on the arms and hold the weight, C, on the fast pulley; but when the velocity of the spindle is decreased by the cloth catching in the rollers, the balls run in and the weight, C, drops; thus throwing the belt from the fast to the loose pulley, and stopping the mill. As the belt driving the spindle is connected with the fulling mill, any variation of speed in it will instantly be felt by the balls, which will run in toward the center, as shown by the dotted lines, and effect the result alluded to. This renders the fulling mill self-acting as regards the cloth, and it is obviously a useful improvement.

Patented Aug. 30th, 1864, by Benjamin Stott, of Westerly, R. I., from whom all further information can be had.

Improved Railway Truck.

The object of this invention is to reduce the resistances encountered by the ordinary truck in traversing curves and other irregularities of track, whether of alignment or surface. In this improved truck the flange tends constantly away from the rail; dragging of the wheels, in rounding curves or passing uneven parts of the track, is effectually obviated. The manifest results are diminished wear and tear of track and rolling stock, and economy in the use of the motive power—all cardinal points in operating railways. The simple modification necessary to adapt all ordinary patterns of trucks to this plan may in part be comprehended from the engraving. At A the only additional parts employed are shown: other differences are in dimension only, and the whole may be explained by a brief reference to devices heretofore invented for the same purpose, and the causes of their failing to answer. In one, the wheels were made independent of each other, so that the outer wheel, in rounding curves, might turn oftener than the inner, in proportion to the greater length of the outer rail. This arrangement failed, because the axles were fixed permanently in one position, the front axle parallel to that behind. A common wagon, so built, could not be turned round on a common road, it would have to be dragged round. Moreover, there was nothing in this arrangement to carry the flange clear of the rail; after contact it might be expected to crowd against it. In coning the tread of the wheels, so as to make the periphery next to the flange greater than at the opposite edge of the tread, inventors have approached the true solution of the problem. A simple pair of wheels, with coned tread and fixed in the ordinary way upon the axle, constitutes beyond doubt a self-guiding system. But when two are coupled together, with the two axles confined in rigid frames, each operates to control the other, as explained in the case of loose wheels.

In the truck which the engraving illustrates, the truck frame is made to carry a pedestal and friction box for each axle centrally placed, through which the impelling power is transmitted to the axles and wheels, in a manner not controlling the directions they may strive to assume. The guiding power of the coned tread will infallibly and constantly direct the flange away from the rail. A curve or unevenness in the track may tend to produce contact, but its effect will be counteracted in less than a single revolution; and in traversing the curve the outer wheel will run upon the periphery which corresponds to the greater length of its journey. Proper dimensions are then to be assigned to the friction boxes bearing the load, and the pedestals in which they work, to admit of free play, within certain limits o direction, to the axles. Assuming ordinary proportions, and supposing truck and alignment perfect, a curvature of 300 feet radius may be overcome by the improved truck, without grinding a flange or dragging a wheel. In like manner accidental inequalities of surface or alignment will be overcome, whenever they occur, with the minimum wear and tear and waste of motive power. This invention was patented on the 13th of May, 1862. Liberal terms will be made with any railway company disposed to establish, by a full and extended trial, the real value of this invention. Address the inventor. Edward Frost, Civil Engineer, Station H, New York Post-office.



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